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Recent Trends in Infant Feeding

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Infant feeding has come a long way since the days when it was the rule in France that only asses' milk be used when a mother could not nurse her baby. No one has yet come forward to suggest that there is any better food for the baby than breast milk. Nevertheless, infant feeding is still developing.

A. Newborn Period

The present trend is to consider the mother and her newborn infant as one entity, not separated by the last labor pain. Heretofore the custom has been to do what is necessary for each in the case room, then send them in opposite directions, the baby to the nursery to be cared for by the pediatrician, the mother to her room to be cared for by an obstetrician. The two never get a chance to get acquainted until they reach home together on the 10th to 14th day. The mother does not see the baby at all until 12 to 36 hours after delivery and then sees not the baby but a bundle of hospital clothes which is closely supervised by an attending nurse who tells the mother what to do and leaves the baby for only a few minutes.

Subsequent visits are too short in duration for the mother to learn much of the infant's reactions to feeding. She is reassured by the pediatrician that the baby has no abnormalities but she is not allowed to see her baby's body until she is taken to the nursery before she leaves the hospital for a demonstration of bathing.

The result has been two separate births, a somatic birth in the case room and a psychic birth after arrival home. And it is just this intervening period which is so important for the psychic development of both mother and baby in their relationship to one another.

During his stay in hospital the baby has slowly attained some consciousness of a new world. At present the mother is not allowed to observe any part of this development. She is unfamiliar with his first awakening. She needs to observe the physical manifestations of pain, contentment, discomfort, satiety and hunger as they express themselves in the baby's behavior.

Every mammalian mother except the modern hospitalized human gets the thrill of responding

to her baby's first cry for food—a deep-rooted reaction of survival. No amount of well-intentioned nursing can ever replace the natural development of basic emotional and physical reactions. The results of our present system have been babies with faulty conditioning and mothers with warped emotional and physical reactions. The consequence has been the rise of pediatrics as a means of trying to re-establish normal breast feeding, or, when failure has to be admitted, to substitute some satisfactory method of survival.

Two things have brought about a greater appreciation of the importance of the first two weeks in the development of normal baby-mother reactions, both a result of war conditions:

1. Due to the overcrowding of the urban hospital obstetrical services, mothers have been sent home with their babies much earlier than the traditional tenth day. When compared with those who stayed in hospital 12 to 14 days, breast feeding was established much more easily and with far fewer problems.

2. Due to the shortage of nurses some institutions have experimented with placing cribs alongside the mothers' beds, using the mothers to help with the care of the babies. All have reported satisfactory and some, spectacular results. George Washington University Hospital in Washington, D.C., has gone so far as to remodel its entire obstetrical service so that the babies are now constantly with the mothers from the time they leave the case-room. Not only has this system resulted in better breast feeding but it has simplified certain problems of isolation from infection.

The trend, then, in the newborn period is to let nature establish the normal mother-child reactions in the manner that nature had been doing for countless generations.

B. Breast Feeding

Here the trend has been toward the so-called **self-demand regime**. There has been a growing tendency among pediatricians for a long time to make the schedule fit the baby rather than to make the baby fit the schedule. Numerous reports are appearing in the literature of series of cases started as soon as mother and baby were released from the stifling routine of the hospital ward.

allowed to nurse as and when they pleased. The principle takes into account the fact that babies as well as mothers are individuals and that there are tremendous daily individual variations. It is found that the times of nursing are different each day and that there is a surprising variation in intervals between nursings and in the duration of different nursings.

During the third and fourth weeks of life six and seven nursings a day are common. By the sixth week five nursings a day predominate. By the ninth week most babies on the self-demand regime are satisfied and growing well on four nursings a day, as compared with the five nursings a day of those who are conditioned to a four hour interval at set times. By the twenty-second week, or the end of the fifth month, most of the self-demand regime babies have automatically put themselves on three feedings a day, which is rarely accomplished in the conditioned baby before the seventh month and usually not until after the ninth month. Mothers who have tried both are almost without exception most enthusiastic in feeding the baby by the baby and not by the clock.

Some of the pressure for the recognition of the importance of the intimacy of the mother-baby relation during the first two weeks of life has come from the self-demand regime group and the changes in obstetrical nursery routine have been a result rather than a cause of the self-demand regime.

Another trend in breast feeding has been to start solid foods earlier. The old idea that of the carbohydrates only sugars could be digested by the newborn has been largely exploded in the field of artificial feeding, where thick cereal feedings were found to be useful in the vomiting of pylorospasm. The tendency has been to add cereals as young as the second month. With the increasing knowledge of the mineral requirements of the growing infant and the lack of iron in milk, vegetables are now added at the fourth month or soon after with decidedly beneficial results. The earlier addition of solids is made possible by a better knowledge of allergy and the ability to recognize such cases promptly and immediately withdraw the offending allergens.

C. Artificial Feeding

The present trends in artificial feeding are the result of our increasing knowledge of curd softness. Artificial feeding dates from 1869 when Biedert published his chemical studies of human and cows' milk. Since the time of Claude Bernard's work on nutrition during the last decade of the past century, until about a decade ago

pediatricians were busy figuring calories and percentage composition. But during that era, pediatricians learned that no matter how closely the formula was calculated, the theoretical usually had to be adjusted away from the ideal to fit, in a practical manner, the appetite, the tolerance, the digestion and the rate of growth of each particular baby. Therein lay the art of artificial feeding. Consequently each pediatrician came to depend on certain stock formulae which could be adjusted as readily or more so than those calculated accurately. Nevertheless, this era gave pediatricians a familiarity with the fundamentals of nutrition which would be hard to acquire otherwise.

During the early part of this era physicians struggled with the tremendous mortality and morbidity of intestinal infections among bottle-fed babies. Our almost universal acceptance of the value of pasteurization as a public health measure for protecting communities, while it did not solve the problem, is a direct result of the work of that generation. Similarly, when Henry Coit of Newark, N.J. conceived the idea of Certified Milk and Nathan Strauss, the philanthropist, made possible milk depots, they too thought that they might solve this problem and little dreamed that their failure would be overshadowed by their success in laying the foundations of modern scientific dairying.

It was the campaign of educating mothers to boil the formulae and finally the development of modern home refrigeration along with changing methods of transportation which eliminated horse manure as a breeding place of flies on the streets, which finally brought about the change.

For certain practical reasons cows' milk came into general use as a substitute when breast milk was not available. It had to be diluted with water because small babies could not tolerate its casein content, six times that of breast milk,—and its high mineral content, three times that of breast milk, meant that its buffer action was far greater. The calories had to be brought up by carbohydrates which are nearly twice as great in breast milk, or by fats. The use of top milk mixtures had its vogue until Czerny and Kleinschmidt explained many of the failures by the fact that cows' milk fat has a far greater percentage of the irritating volatile fatty acids than has breast milk fat. That was the era when mathematics predominated because the margin of safety was small.

When Casimir Funk in 1910 invented the word **vitamin** to explain some of the conditions of deficiency feeding, he unwittingly played into the hands of the opponents of universal boiling. It

was not until the development of the quantitative chemistry of the essential food substances that it was realized that the reason cows' milk was not a complete food for the infant was not so much the fault of the milk as the fact that it is physically impossible for the baby to take as much milk each day as a calf does. Any destruction by boiling did not make any appreciable difference when there was not the same concentration as in breast milk to begin with.

The step that finally established universal boiling was the demonstration by Joseph Brennemann of the effect upon the curd of cows' milk. He showed that when breast milk enters the stomach of the infant, it coagulates forming whey which contains the lactalbumin and fine, soft, friable almost impalpable and easily permeable coagula of casein, through which the digestive juices can permeate with ease. Comparatively, he demonstrated that when diluted cows' milk enters the stomach of either baby or calf, it begins to coagulate in a few minutes, forming at first fine soft curds that rapidly and perfectly separate themselves from the whey. These young curds have the peculiar property of coalescing leaving no discernible line of cleavage. They increase in size until at the end of about two hours, instead of a fine flocculent mass there is one or several large masses of a consistency of crude rubber and the size of walnuts. These are attacked only on their surfaces by the digestive juices because of their impermeability. In the calf this conditions the stomach to the early use of coarse foods. But because of the difference in size of the pylorus in the baby, the whole process of digestion is altered. With the older child on a mixed feeding this does not hold to the same extent. Brennemann further demonstrated that when cows' milk is boiled the coagulum more nearly approaches that of human milk the longer it is boiled.

Since then the process of the attenuation of the curd has been the major factor, intentionally or unintentionally, in the success of substitutes for breast milk. Fermented lactic milk was first thought to have merits because its buffer action more nearly approaches that of breast milk. It is now known that its digestibility is due to its more flocculent curd, not only because the milk is first boiled before it is cultured but more so because of the action of the culture on the curd. The same is true of the curd of acidified milk in which case the acid affects the flocculence of the curd.

During the era of diarrheas, Finkelstein's protein milk was devised and because of its low carbohydrate content it is still our best armament in fermentative flora of the intestines. It has a soft flocculent curd. Peptonization, once popular, had the same effect but to a lesser degree. It was a step in the right direction.

The finer fat globules of human milk which do not layer out as cream like the globules of cows' milk, seem to be a factor in the formation of a softer curd. This has resulted in the process of homogenization by which dairy milk is forced through very fine apertures at 2,000 to 3,000 lb. pressure. This, however, is of more value as sales talk for dairies and in masking the cream content from the eyes of the overcritical housewife, thereby making possible a more effective pasteurization which also diminishes the cream line.

As methods of storing milk by drying and by evaporation were devised it was found that these processes also altered the curd. At present evaporated milk diluted and with added carbohydrate, and where indicated by vomiting, acidified, is the most popular substitute for breast milk. Its uniformity, cheapness, availability and ease of storing are some of the practical considerations involved. In its manufacture it is scalded, then held at 130° Fahr. in vacuum pans until about 55% of the water is removed. It is then homogenized before it is sealed in cans and sterilized at 240° F. This prolonged heating and to a less extent the homogenization results in a curd which more nearly approaches that of breast milk than any other of the milk substitutes in the same price range.

There is a series of expensive milk substitutes which have their place in the feeding of pre-matures and digestive disturbances, such as SMA, Lactogen and Olac. They simulate breast milk more accurately in their percentage composition of fats, carbohydrates and protein, in their mineral content and buffer action, in the ratio of lactalbumin to casein, in the nature of their fats by the use of vegetable sources, and by the addition of vitamins. But all of them seem to owe their success chiefly to the flocculence of their curd. And in the well baby they seem to have no advantage over the judicious use of evaporated milk mixtures with a proper use of vitamins, and the addition of solid foods at the proper time.

Thiouracil in the Treatment of Hyperthyroidism

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The fundamental cause or causes which underlie the development of hyperthyroidism, both "Graves' Disease" and toxic adenoma, are still unknown. It seems highly probable that the thyroid gland itself may not be the prime factor in the production of hyperthyroidism but that it may act in response to the increased production of the thyrotropic hormone of the anterior pituitary. What gives rise to this pituitary hyperfunction is not known and indeed it may well be that different causes operate in different circumstances.

The therapeutic approach to hyperthyroidism has always been and still is, concentrated on the correction and future prevention of the widespread metabolic effects of the excessive production of the thyroid hormone, usually by the surgical removal of the greater part of the thyroid gland. The introduction of iodine by Plummer in 1923 was a notable forward step in making surgical treatment less hazardous, and with the use of iodine and other pre-operative and post-operative measures the surgery of hyperthyroidism has attained a high degree of efficiency. However there still remains an appreciable mortality, especially in severe cases and in those resistant to iodine, and a small but significant morbidity from persistent or recurrent hyperthyroidism. Moreover in such severe cases surgical treatment often requires prolonged hospitalization and multiple operations.

Alternative methods of treatment have been tried, notably radiation of the thyroid gland and its more modern counterpart, the administration of radioactive iodine, but it is undoubtedly true that the final answer to the treatment of hyperthyroidism has yet to be attained.

The Nature of Antithyroid Drugs

In 1941 it was observed by ¹C. G. and J. B. MacKenzie and E. McCollum while carrying out experiments on the feeding of Sulfaguanidine to rats, that this compound produced marked thyroid hyperplasia and myxedema. Iodine did not prevent or reverse this response. About the same time ²C. P. Ritcher and K. H. Clisby in America and ³Kennedy in England made similar observations with regard to phenylthiourea. ⁴E. B. Astwood of Boston confirmed and extended these observations, studying experimentally the antithyroid effects of more than one hundred compounds. He found that two types of compounds, the sulfonamides and another group of substances related to thiourea, exhibited antithyroid effects in different

degrees. The most active compound in the thiourea group was the cyclic compound thiouracil although since that time other related compounds have shown similar or greater potency. The sulfonamides were shown to be active in animal experiments but the effective dose was thirty to two hundred times that of thiouracil and the dosage required would obviously be impractical in clinical practice.

The Mechanism of Action of Thiouracil

Thiouracil is only active in the presence of the anterior pituitary and in hypophysectomized rats, it does not prevent atrophy of the thyroid. In the intact animal and in man the administration of thiouracil produces changes in the pituitary similar to those which follow thyroidectomy but the thyrotropic activity of the serum is not increased to the same extent, suggesting increased utilization of the thyrotropic hormone by the hyperplastic gland.

The thyroid gland itself undergoes marked hyperplasia, as evidenced by increase in size, increase in the height of the epithelium with papillary infolding, disappearance of colloid and an increase in the vascularity and amount of lymphoid tissue. In man the increase in the size of the gland is not usually observed but the changes are otherwise the same.

The next step in the elucidation of the mechanism of action of thiouracil was that thyroid extract or thyroxin prevented hyperplasia whereas the administration of iodine did not. Diiodotyrosine had little delaying effect on the action of thiouracil. Finally in both animals and man thiouracil prevents the storage of iodine by the thyroid and causes a rapid loss of both thyroxin and non-thyroxin iodine from the gland, and at the same time the level of the "protein bound" or "hormonal" plasma iodine drops below normal levels.

From these observations it may be concluded that thiouracil acts by preventing the elaboration of the thyroid hormone at an early stage in its synthesis, probably at the stage of iodination of tyrosine. The lack of thyroid hormone thus produced, leads to an increase in the production of thyrotropic hormone which in turn stimulates the thyroid to ineffectual hyperplasia. In short the antithyroid effect is a direct one on the thyroid gland but the hyperplasia is induced via the pituitary and the thyrotropic hormone, and the effect of thiouracil might be classified as a chemical thyroidectomy which is reversible with withdrawal of the drug.

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The rapidity with which thiouracil acts varies with the state of the thyroid gland at the time it is started. In normal glands, in the resting colloid phase, the effect is relatively slow because of the stores of hormone in the gland. In the actively hyperplastic gland of severe Graves' Disease the effect may be more rapid, for although the production of the hormone is great the stores are small. However in the hyperplastic gland which has been given iodine the response tends to be slower because of the storage of hormone induced by the iodine. So far as is known thiouracil does not affect any of the other endocrine glands, with of course, the exception of the pituitary, in the production of thyrotropic hormone.

The Absorption, Distribution and Excretion of Thiouracil

When given in ordinary doses thiouracil is rapidly absorbed. Approximately 25 per cent may be destroyed in the gastro-intestinal tract before absorption but the remaining 75 per cent rapidly reaches the blood stream. Maximum blood levels are reached in fifteen to thirty minutes after which the blood level rapidly falls although traces may be demonstrated for 48 to 72 hours. The concentration in the cellular elements of the blood is considerably higher than in the plasma, and in the leucocytes there are relatively larger amounts than in the red cells.

Excretion is via the kidneys and occurs rapidly but a fairly high proportion is broken down in the tissues before excretion.

Thiouracil is taken up by the tissues in higher concentration than in the body fluids. Those tissues which store the greatest amount per unit weight, also show the greatest activity in its destruction, notably the pituitary, adrenals, thyroid, bone marrow, and liver. An interesting observation is that in nodular goitres the adenomata contain about ten times as much as the remaining thyroid tissue.

The Response to Thiouracil in Hyperthyroidism

Since 1943 a large number of reports, covering several thousands of cases on the response of hyperthyroidism to thiouracil have appeared in the American and British literature. Though their approach to the problem may differ, practically all observers are now of the opinion that the symptoms and signs, both clinical and laboratory, which may be attributed to the excessive secretion of thyroid hormone disappear provided the dose is adequate and maintained for a sufficiently long time. The reported failures, less than five per cent, have almost all been treated for what is now known to be too short a period with inadequate doses and many received preliminary

iodine. An additional group which, of course, must be considered as failures are those in whom the drug had to be discontinued because of toxic reactions.

The clinical response to thiouracil is usually gradual and unspectacular but there is a steady improvement in subjective symptoms which is commonly evident before the objective signs appear. There is a fairly prompt drop in the basal metabolic rate which is closely paralleled by the "protein-bound" plasma iodine. The abnormal carbohydrate metabolism, the negative nitrogen, calcium, and phosphorus balances, the blood cholesterol and the creatinuria gradually return to normal values. Tachycardia is often the last manifestation to disappear. In contrast to iodine therapy, thiouracil constantly returns the basal metabolic rate to normal or subnormal levels. The rapidity with which all these effects are brought about is enhanced by the other therapeutic adjuncts such as rest, high caloric, high carbohydrate diets, and supplemental vitamin therapy. The time required to bring about this response varies from three to ten weeks. In general, diffuse toxic goitre responds more rapidly than nodular toxic goitre. The administration of iodine prior to thiouracil, with its attendant colloid storage tends to delay the response while coincidental administration of iodine and thiouracil is also believed, by some observers, to delay the response. Probably the best combination, at least on theoretical grounds is the administration of iodine only when the response to thiouracil has reached completion.

Exophthalmos is not only unaffected by thiouracil but in fact may be increased, which is further suggestive evidence that exophthalmos is not a part of hyperthyroidism per se.

The response of thyrocardiac patients is in the main similar to those without heart failure. There are many reports of the re-establishment of normal rhythm in cases showing auricular fibrillation but a definite comparison with thyroidectomy in this connection has not yet been possible.

Dosage

The optimum dose of thiouracil has been found from experience not to exceed 0.6 grams daily in three equally divided doses. Larger doses are unnecessary as they do not hasten the antithyroid effect and increase the incidence of toxic effects. Smaller doses 0.4 grams daily are adequate in some cases. An effective schedule of dosage is 0.6 grams for a sufficiently long period to reduce the basal metabolic rate by half, then 0.4 grams daily till the metabolism is normal and thereafter 0.1 to 0.2 grams daily.

Toxicity of Thiouracil

Although nearly thirty toxic manifestations have been reported as accompanying thiouracil therapy there are only four reactions which need be regarded as serious. These are Agranulocytosis, Leukopenia, Drug Fever, and Skin Rashes. One case of Thrombocytopenic Purpura has been reported. Recently two extensive surveys of the toxicity of thiouracil have appeared, one a co-operative study pooling the experience of twelve American Clinics and the other a questionnaire survey covering 5,745 cases treated by 328 physicians. Although differing in method the results of these two studies are in remarkable agreement.

Thiouracil depresses the total leucocyte count in the initial 4—8 weeks of treatment in a majority of cases even when allowance for the leukopenia of hyperthyroidism is made. If leukopenia may be arbitrarily defined as a total leucocyte count of below 4,000 it occurs in 3 to 4 per cent of cases receiving thiouracil. Previous courses of treatment with intermission increases this incidence. The leukopenia commonly disappears despite continuation of treatment but its appearance must always be regarded as a danger signal as it may be the precursor of more serious granulopenia and close observation is essential. If the total leucocyte count falls below 4,000 and if less than one-third of the total leucocytes are granulocytes thiouracil medication should be discontinued.

Similarly more serious agranulocytosis, with total counts below 2,000 and less than two per cent granulocytes with or without the clinical manifestations of fever and severe pharyngeal infection, occurs as a direct result of thiouracil and constitutes the most serious hazard in the use of the drug. In the two surveys cited incidence of agranulocytosis was approximately two per cent and 25 per cent of these cases were fatal, giving rise to a mortality rate of .5 per cent of all cases receiving thiouracil. The peak incidence is between the fourth and eighth week of treatment though it may occur at any time during a prolonged course and the incidence is significantly higher in cases receiving a secondary course of treatment, suggesting sensitization. As a rule agranulocytosis appears without warning and even weekly counts have failed to detect potential cases. It is therefore evident that the threat of agranulocytosis is a definite one and it offers a risk of a .5 per cent mortality to patients receiving thiouracil.

Drug Fever, with or without erythematous skin eruptions, occurs in approximately five per cent of patients and is important chiefly because it necessitates cessation of treatment. A mild diffuse

glandular enlargement is another fairly common but less important toxic effect of thiouracil.

Discussion

Three years of clinical trial have shown that thiouracil is capable of inducing complete remission of thyrotoxicosis in practically every case and that a normal or subthyroid state can be maintained indefinitely by a small daily dose. The remission may continue after cessation of treatment, but so far it is impossible to state the proportion in which this may be expected to occur. At present the evidence indicates that continuous treatment must be maintained for a minimum of six months, preferably considerably longer, and that the outcome with regard to relapse is unpredictable in any individual case. In a series of 100 cases given prolonged continuous treatment with thiouracil, Williams has reported that 51 per cent relapse within five months of cessation of treatment. From this it appears certain that a high incidence of relapse, especially in cases with severe thyrotoxicosis or much glandular enlargement, can be expected even with prolonged treatment. If thiouracil were non-toxic such treatment could be carried out indefinitely without danger but, unfortunately, such as not the case and if the physician embarks on a program of administering thiouracil for long periods he must assume responsibility for close observation of the patient in order to obviate, insofar as is possible, serious or fatal toxic reactions. This entails weekly observation, leucocyte counts and close observation of any intercurrent illness, which may be practicable in specially selected cases or groups of cases but which can hardly be applicable to all cases of hyperthyroidism.

The hazards of operative treatment are largely associated with severe hyperthyroidism, cases exhibiting a poor response to iodine, and those with thyrotoxic heart disease. Under such circumstances operation must be carried out in the face of greater or lesser degrees of thyrotoxicosis or cardiac failure, and even with prolonged preparation and multiple operations the post-operative course frequently is stormy and prolonged. It is in these groups that mortality from thyroidectomy is highest. Thiouracil is undoubtedly capable of causing a complete remission of hyperthyroidism in such cases. The average rate of fall of the basal metabolic rate is roughly 1 per cent per day and although there are technical difficulties due to increased vascularity and friability of the gland it is the most effective means of pre-operative preparation. When operation is deferred till the basal rate is normal and pre-operative iodine has been given to minimize hyperplasia the course following thyroidectomy is smooth and multiple operations are rarely if ever required. The risk

of serious toxic manifestations is minimal in the first six weeks of thiouracil treatment but of course the leucocyte count must be watched carefully and treatment discontinued if serious leukopenia or fever appears. Many cases of thyrotoxicosis do not require thiouracil as a pre-operative measure, especially the milder cases where iodine preparation followed by thyroidectomy carries practically no risk.

Conclusions

(1) Thiouracil has been shown to cause complete remission of thyrotoxicosis in practically every case in which treatment can be maintained for a sufficient period of time.

(2) Although remissions caused by thiouracil continue for as long as the drug is being given a high proportion of cases relapse within a relatively short time after its discontinuance, even after prolonged therapy.

(3) The risks of prolonged thiouracil therapy in all cases of thyrotoxicosis are as great, if not greater than the risks of thyroidectomy.

(4) When used pre-operatively thiouracil therapy improves the prognosis of severe hyperthyroidism, especially in cases exhibiting iodine resistance or thyrotoxic heart disease.

(5) Prolonged thiouracil therapy without thyroidectomy should be reserved for cases in which operation is contraindicated even after the thyrotoxicosis has been controlled; for recurrent hyperthyroidism following thyroidectomy; or for the rare case in which operation is refused.

References

- 1 MacKenzie, J. B., MacKenzie, C. G., and McCollum, E. V.: *Science*, 84, 518, 1941.
- 2 Ritcher, C. P., and Clisby, K. H.; *Proc. Soc. Exp. Biol. and Med.*, 46, 684, 1945.
- 3 Kennedy, T. H.; *Nature*, 150, 233, 1942.
- 4 Astwood, E. B.; *J. Pharm. & Exp. Therap.*, V. 78, 79, 1943.
- 5 Toxic Manifestation of Thiouracil Therapy, *J. Am. Med. Assoc.*, V. 130 (6), 315, 1946.
- 6 The Clinical Toxicity of Thiouracil, *J. Am. Med. Assoc.*, V. 130 (6), 343, 1946.
- 7 Williams, R. H.; *J. Clin. Endocrinol.*, V. 6 (1), 1946.
- 8 Riker, W. F., and Wescoe, W. C., *Am. J. Med. Sc.* V 210(5) 665, 1945.

Treatment of Carcinoma of the Prostate

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Before discussing the current treatment of cancer of the prostate I would like first to review some important established facts regarding the prostate gland that are not readily appreciated.

1. Incidence:

Cancer of the prostate is much more common than we believe. The incidence of cancer of the prostate gland in men of 50 years is 17.3%. Those over 60 years is about 25% and it is said to occur in about one out of every five operated on for benign hypertrophy¹.

2. Prostatectomy:

Another important misconception is the interpretation that prostatectomy means removal of the prostate gland and in that way you prevent the development of cancer or recurrent prostatic hypertrophy². This is absolutely not so. Prostatectomy is done for the removal of the tumor of the prostate gland and not the prostate gland itself. The adenoma grows slowly compressing the surrounding normal prostatic tissue. This compression transforms the normal tissue into the so-called surgical capsule of the prostate gland, and none of the surgical procedures at our disposal whether it be suprapubic, perineal or transurethral operation removes the entire prostate gland. The prostatic tissue remains in the form of a capsule after all of these operations and surgery in any form does not insure the patient against subsequent development of a recurrent

adenoma or a carcinoma. The entire prostate is not removed by any of these methods.

3. Spread:

It has been pointed out by Kahler of the Mayo Clinic³ that the most important criterion of cancer spread in the prostate is that microscopically, cancer spreads along the perineural lymphatics. There is no relationship between the size of a prostatic carcinoma and the incidence of metastases. No matter how small the growth, even if it is about the size of a pea, perineural involvement is extensive and therefore complete removal of the tumor itself is impossible whether it is by transurethral, suprapubic or perineal. It does not eradicate all the tumor tissue even in the case of neoplasms of a low grade malignancy. In tumors Grade III and IV there is a 100% spread, 87% in Grade II and 85% in Grade I; which means an average of about 91% all in all. That explains why in a pathological fracture a primary source is sometimes impossible to find until at autopsy you find a small impalpable growth in the prostate as the primary source.

4. Site:

It was taught for many years that the usual site of carcinoma is in the posterior lobe. Serial sections done by various authorities now prove⁴ that cancer occurs just as frequently in the lateral lobe and anterior lobe as in the posterior lobe.⁴

5. Gross and Microscopic Appearance:

Microscopic and gross appearance of 195 tumor examinations at the Mayo Clinic showed that only six were of scirrhous variety, the remainder were adenocarcinoma: Grade I, 19%; Grade II, 50%; Grade III, 27%; Grade IV, 3.5%.

In Grade I, 75% of the tumors are differentiated, i.e., tumor attempts to form acini similar to normal prostate gland tissue; and produces prostatic secretion the same as thyroid tumor produces thyroxin and, therefore, is composed of adult tissue and is the lowest grade of malignancy. This classification has a bearing on prognosis as will be pointed out later.

Up until 1942 there was no special treatment for carcinoma of the prostate. When obstruction set in either a permanent suprapubic cystotomy was done or a transurethral punch. In 1942 Huggins of the University of Chicago published the results of orchidectomy and androgen control in a series of 75 cases. These cases were followed up for only one year. The results he claimed were spectacular in about 75% of his cases and urologists became so enthusiastic over them that nearly every one who had a large prostate was castrated. Immediate results were excellent. The patient showed dramatic improvement. He gained in weight, his morale improved and there was an increase in his red blood count, and even the agonizing pain of those patients with metastases was almost immediately relieved.

Following that report I had three cases of my own.

(1) One was completely relieved for about six months but after that turned bad and died.

(2) The second man had advanced disease with metastases. He came into the hospital by ambulance and 48 hours after orchidectomy was out of bed. The result was almost miraculous. All his pain disappeared and he returned to work as a janitor for over nine months, when pain recurred and he died.

(3) The third case was an advanced carcinoma with a permanent suprapubic cystotomy for obstruction. He had an alkaline encrusted bladder and was in a hopeless mess. Orchidectomy was done. He was given frequent bladder irrigations and was quite comfortable for about three months. He even volunteered the statement that "life was worth living again."

Those who have tried this type of treatment find that nearly all patients followed this same clinical course after castration and stilboestrol treatment. They get an immediate excellent result varying anywhere from nine months to three years but eventually all of them develop what is called "delayed failure" and ultimately die.

The only scientific way to evaluate any treatment is to follow up a large series of cases over a long period of time. Herger⁵ of Buffalo followed a series of 130 cases and Nesbitt and Cummings⁶ followed a series of 75 cases anywhere from 31 to 36 months with the same results.

I would like at this point to review the evolution of this treatment. That the testes control secondary sexual characteristics was noticed many years ago.

(1) Turks castrated adolescents to create Eunuchs.

(2) A farmer castrates roosters to produce capons in order to increase the amount of meat and its delicacy.

(3) Harvey first observed that the testes and prostate have something in common. He found that after castration the prostate of bulls began to atrophy.

(4) White⁷ was the first to apply this scientifically in 1893. He first did a number of castrations on dogs and found that their prostates began to atrophy and became smaller. Two years later he castrated 180 patients with prostatic enlargement and claimed dramatic relief but this was not accepted by the medical profession.

(5) Randall⁸ in 1934 castrated five patients for prostatic carcinoma with complete relief but did not report this until 1942.

(6) Munger⁹ irradiated the testes in 1942 and claimed complete relief.

(7) Huggins¹⁰ finally proved a definite relationship between the testes and prostatic gland by performing a number of ingenious experiments on dogs with very conclusive results.

(a) He administered androgens (testosterone) and found that it produced hyperplasia of the prostatic ducts and an increase in the prostatic secretion.

(b) He then gave them oestrogen and the prostate gland returned to normal and prostatic secretion decreased.

(c) In another group castration also showed a decrease of the prostatic secretion and regression of the epithelial cells. He concluded, therefore, that testosterone definitely stimulated the growth of the prostate gland, whereas oestrogen produced the opposite by promoting atrophy.

The next step was developed in the chemistry department. Kurtcher and Wolberg discovered phosphatase enzyme in 1935. This enzyme splits organic phosphorous compound to give free phosphate ions. Alkaline and acid phosphatase are present in the blood normally.

1. Alkaline Phosphatase: 3 to 15 units per 100 cc. blood. This enzyme is increased in the blood whenever there is an extensive reaction in

bone and is, therefore, not a specific response as it may be present in the following conditions:

(a) Rickets—deficiency of calcium and phosphate.

(b) Hyperparathyroidism—loss of calcium and phosphate.

(c) In metastases—reaction of bone to injury.

11. Acid phosphatase is an entirely different enzyme and is shown to be a specific chemical hormone which has to do with secondary sexual characteristics.

Gutman¹¹ after extensive research of the acid phosphatase enzyme found:

(a) Many organs in the body contain acid phosphatase, e.g., liver, kidney and bone contain as much as 5 units per gram of fresh tissue, but most important of all is the fact that the prostate is the only organ in the body which contains huge amounts, e.g., 500 - 25,000 units.

(b) There is very little acid phosphatase in infants up to puberty but it increases after that age. The function is unknown but it probably has something to do with the motility of sperms.

(c) In cancer of the prostate where the capsule has been ruptured acid phosphatase goes up as high as six units per 100 cc. Why should it rise so high?

In women, who have the same quantity of acid phosphatase in the serum as men, there is no pathological condition which gives a high acid phosphatase over three units. Therefore, we can assume that the only source of high acid phosphatase in men with cancer of the prostate is due to rupture of the capsule and liberation of acid phosphatase into the blood stream.

On the basis of phosphatase findings we divided the patients into four groups¹²:

(1) A normal patient: acid phosphatase — 3 units, alkaline phosphatase — 3 - 15 units, prostate normal.

(2) Early cancer which is palpable by rectal examination, or routine physical: acid phosphatase normal, alkaline phosphatase normal. This means an intact capsule and ideal treatment, according to Young, is perineal prostatectomy. This means complete removal of the prostate with anatomical capsule, seminal vesicles, vasa differentia and a portion of a trigone. This operation must be rare because it is almost impossible to diagnose cancer of the prostate early and recent conception of a perineural spread in even microscopic cancers should abolish this operation. In this group it is important also to realize that miniature cancers are often not detectable in life but are definitely proven to be common in routine autopsies. It is possible that promiscuous use of testosterone for impotence in elderly people increases the prostatic tissue as well as the pros-

tatic secretion and in this way may stimulate the growth of these cancers¹³.

III. Cancer perforates the capsule without metastases: serum acid phosphatase increases up to 6, alkaline phosphatase 3 - 15.

IV. Cancer perforates capsule and metastasizes to bone: Alkaline phosphatase rises up to 250. This increase in alkaline phosphatase is of value in detecting metastases long before there is radiological evidence of metastases.

It was shown that testosterone causes hypertrophy of the prostate and an increase in the secretion which is actually acid phosphatase by the following evidence.

After castration or stilboestrol administration, the prostate atrophies, secretion stops and the acid phosphatase in the blood drops. This actually happens after castration for cancer of the prostate. The acid phosphatase drops from 6 units to 3 units. Coincident with this the patient improves clinically. The conclusion is that if we get rid of all the testosterone in the system we should get a cure. We get a direct index of the amount of androgen in the blood by measuring the 17-ketosteroids in the urine.

Testosterone is excreted in the urine, not as testosterone but in the process of metabolism is broken down to 17-ketosteroid¹⁴. The 17-ketosteroid is a steroid with a ketone group attached to the 17th carbon atom.

After castration we find a tremendous drop in 17-ketosteroids in the urine but there is still some present. As time goes by it increases in amount until in 8 to 10 months it reaches the normal value and by that time the patient's symptoms recur and he is in "delayed failure." Now where is this 17-ketosteroid coming from? The only other source of 17-ketosteroid in the body is corticosterone from the adrenal gland. This is nature's way of compensating androgens after loss of the testes. That the adrenal gland is responsible was proven at post-mortem by Herbst who found the adrenals of cancer patients in delayed failure to be 4 to 7 times the normal size. To overcome this compensating function in the adrenal and in this way get rid of all the androgens in the body Huggins removed both the adrenals in three patients with cancer of the prostate in addition to the castration, but they all died.

There is still this second factor that plays an important part in androgen control. Normally we know that the pituitary gland produces gonadotropic hormones which stimulates both testicle and ovarian secretion. It has been shown by the Cleveland clinic¹⁵ that castration in a rat results in:

- (1) Atrophy of the prostate.
- (2) Hypertrophy of the pituitary gland.
- (3) Excretion of the gonadotropic hormones in the urine.

This hypertrophy of the pituitary was interpreted as an attempt to stimulate the adrenals to produce more corticosterone in order to compensate for the testicular deficiency. This is now found to be of tremendous clinical importance and is the most recent work done on cancer of the prostate. Those patients who had undergone castration and received stilboestrol had carried on for one year or more and then began to develop "delayed failure" were given X-ray therapy to the pituitary gland. Dramatic results were obtained in hopeless cases for as long as nine months or more. Therefore the pituitary gland is another link in the chain that must be seriously considered since it procrastinates the end for another eight to nine months.

The third factor of importance is the nature of the growth itself¹⁶. If the tumor is a highly differentiated adenocarcinoma then the malignant process is really an overgrowth of adult epithelial cells which produce prostatic secretion and acid phosphatase just the same as the prostate would. Many tumors are capable of secreting. A tumor of the thyroid produces thyroxin. A well differentiated adenocarcinoma like normal prostatic tissue would react to androgen control. If on the other hand it is mixed with wild embryonic cells then it will depend on the proportion of the two types of cells in the tumor. A grade I with 75% differentiation could live for years, whereas a Grade IV having only 25% differentiation would not react to androgen control because of the very little secretory power. A carcinoma simplex which is the most malignant embryonic cancer, produces no secretion and therefore castration would have no effect on its clinical course.

Summary (See Fig 1):

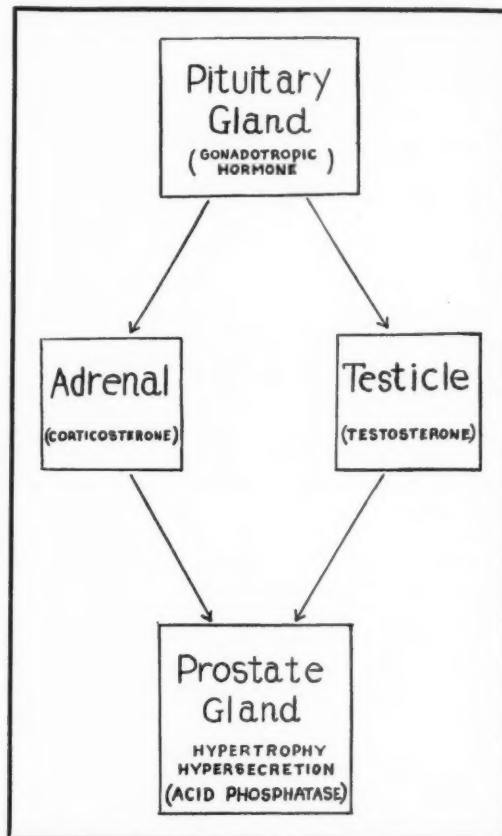
Normally pituitary gland stimulates the testicle to produce testosterone. Testosterone stimulates prostatic hypertrophy and increases secretion (acid phosphatase) which breaks through the capsule in cancer and enters the blood stream. Remove the testes and you stop this process but the pituitary goes into action, stimulates the adrenals which increases corticosterone and this eventually replaces the evil effects of testosterone.

Conclusion:

The treatment of cancer of the prostate is far from completely satisfactory. Treatment of cancer anywhere is hopeless and yet in cancer of the prostate we would delay the tragic result for many months in some cases and do so by simple methods with practically no surgical risk.

(a) Castration results in complete relief of pain within 48 hours even if metastases are present. There is gain in weight, morale improves, appetite improves and there is an increase in red blood cells.

(b) To those who object to castration for psychological reasons an intracapsular removal can be done. This is carried out by cutting down to the tunica-albuginea and scooping out the testicular tissue leaving the epididymis and the



coverings of the testicle so that post-operatively it is impossible to tell if the testes were removed.

(c) In old men there are no psychic effects or muscular debility which is so common in young men after castration.

(d) Stilboestrol should be reserved for those who refuse operation or for recurrence after castration, since it is so often associated with side effects— anorexia, nausea, swelling of the breasts and tender nipples, and should be postponed as long as possible. The dose is 1 mg. daily at bedtime. Larger amounts have been tried but are no more effective and in fact worse, because side effects come earlier.

(e) Deep X-ray therapy to the pituitary should be given either immediately or in delayed failure in order to check its effect on the adrenal gland.

(f) Biopsy of the growth gives a rough index as to how the case will react to treatment. A well differentiated adenocarcinoma has a good prognosis for several years, while a scirrhous carcinoma is hopeless from the start.

Case History

Mr. A. S., age 70 years, was admitted to the St. Boniface Hospital complaining of:

(1) Pain in the back, between the shoulder blades—Five months.

(2) Frequency followed by dribbling and incontinence—Three months.

(3) Severe crampy pain in the calves of both legs—One week.

(4) Obstinate constipation—Years' duration.

Two months after the onset of back pain, the patient first sought medical attention. A radiological examination of the vertebral column was done, and a diagnosis of osteoarthritis of the spine was made. In spite of treatment with moist heat and diathermy, followed by several visits to chiropractors, the pain, which was at first dull and gnawing, gradually increased in severity, until it became almost unbearable and refractive even to morphine.

Past history and family history were non-contributing.

On physical examination, the only findings of importance were some tenderness and limitation of movement in the thoracic and lumbar regions of the spine, a urinary bladder distended to the umbilicus, and on rectal examination, an extremely large prostate gland containing a definite stony hard nodule which was very suggestive of carcinoma.

Laboratory data:

(1) Blood count: R.B.C. 3,080,000; Hb. 59%; W.B.C. 11,500.

(2) Phosphatase test: Alkaline, 25 units; acid, 7 units.

These findings suggested a carcinoma of the prostate gland which had perforated the capsule; the elevated alkaline phosphatase indicating metastatic spread to bone.

A report of the radiological examination of the entire vertebral column and pelvis read as follows:

There are changes about the junction of the descending ramus of the right pubic bone with the ischium which are consistent with secondary malignancy. There is also collapse of the third dorsal vertebra. (Dr. Digby Wheeler.)

An indwelling catheter was inserted and several days later a bilateral orchidectomy performed. On the fourth post-operative day the patient's pain had completely disappeared and he volunteered the statement that "life was worth living again." On the seventh post-operative day a course of deep X-ray therapy to the pituitary gland was begun. On the twelfth post-operative day the indwelling catheter was removed, the prostate had shrunk to two-thirds of its former size and the residual urine was now but two ounces. On the 29th post-operative day the patient was discharged from hospital.

It is now only six months since his operation, but the patient is still free from pain, and is leading a happy and comfortable life. It will be interesting to follow this case and to determine the interval of relief before delayed failure sets in.

Bibliography

- 1, 2, 4 Kahler, J. E., Carcinoma of the Prostate Gland. Mayo Clinic Proceedings, Sept., 1938.
- 3 L. F. Greene, Development of Carcinoma of the Prostate following Prostatectomy. Mayo Clinic Proceedings, Feb., 1944.
- 5 Herger, Charles C., and Sauer, Hans R., Androgen control therapy in 130 cases of Carcinoma.
- 6 Nesbitt, R. M., and Cummings, R. H. J. Am. M. Ass'n, 1944, 124: 80.
- 7 White, J. W. The results of Double Castration in Hypertrophy of the Prostate. Ann. Surg., 22:1, 1895.
- 8 Randall, A. J. Urol., Balt., 1942, 48: 706.
- 9 Munger, A. D., Experiences in Treatment of Carcinoma of Prostate with irradiation of testicle. J. Urol., 46: 1007-1011, 1941.
- 10 Huggins, C., and Hodges, C. V., Studies on Prostatic Cancer. The effect of Castration, or Estrogen and of Androgen injection, on serum phosphatase in metastatic carcinoma of the prostate. Cancer Research, 1: 293-297, 1941.
- 11 Gutman, A. B., and Gutman, E. B., An "acid" phosphatase occurring in the serum of patients with metastasizing carcinoma of the prostate gland. J. Clin. Invest., 1938, 17: 473.
- 12 Dean Et Al: Cancers of Prostate Gland. J. Surgery, Vol. 16, No. 2, 1944.
- 13 Huggins, Charles, The treatment of Cancer of the Prostate. C.M.A.J., April, 1944, Vol. 50.
- 14 Fraser, R. W., Forbes, A. P., Albright, F., Sulkovitch, H., and Reifenshtein, E. C. Jr., Colorimetric assay of 17 ketosteroids in urine. J. Clin. Endocrin., 1941, 1: 234.
- 15 Lower, W. E., Engel, W. J., and McCullough, D. R., Summary of Experimental Research on control of benign hypertrophy and preliminary clinical report. J. Urol. 34: 670-677, 1935.
- 16 Huggins, Charles, Orchidectomy for Cancer of Prostate. Annals of Surg., June, 1942.

An Outline of the Care of the Paraplegic Patient

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Great interest is being shown in the paraplegic victims of the recent World War, and both the lay and medical Press reflect this interest. The purpose of this paper is to present in a general way, the management of the paraplegic, and in particular to stress how much can be done to help these patients. It is not intended to be exhaustive in scope; hence procedures are merely outlined, and controversial points are not discussed at length.

As late as 1941, it was generally felt that the outlook for the paraplegic patient was gloomy, as evidenced by Elsberg's remark¹:

"The patient with a complete transverse lesion of the cord, if he lives for any length of time, is fully incapacitated for work for the remainder of his life."

Such a pessimistic outlook has, however, been altered by recent experience. With proper care and rehabilitation these patients can lead reasonably normal lives. Thus in contrast with the above quotation Munro says²:

"If he has been properly treated, every patient with a spinal cord or cauda equina injury who is intelligent and co-operative and has the use of the shoulder, arm and hand muscles can be made ambulatory; can have such control of the bladder and bowels as to sleep through the night without either getting up or wetting himself; can carry out ordinary activities throughout the day without soiling himself with feces or having to evacuate his bladder oftener than once every three hours; can lead a normal life, and within the limits of his intellectual capacity, can earn a satisfactory living."

Satisfactory treatment must be started from the beginning in order to achieve the best results. At the time of injury the patient may or may not be unconscious. This depends on the presence or absence of other injuries other than those of his spine; for example head injury is frequently associated. If conscious, the patient knows whether or not he is paralyzed. If unconscious, the person who first sees the patient and administers first aid should bear in mind the possibility of a spinal injury, and take this into consideration in handling the case. It is impossible to tell at this stage whether or not irreparable damage to the cord has been done, and therefore every case must be treated as if full recovery were certain. Hence further damage to the cord must be avoided. There should be no hurry in transporting these patients, and they should most certainly not be bundled into a vehicle and rushed at top speed to the nearest hospital. Munro says³:

"No patient with a cord injury, regardless of its level, should ever be moved except by rolling, ever lifted, except on a stiff stretcher that is longer and wider than the patient, and should never be transported except in the face down position."

The victim is carefully taken to a hospital, and if possible to one where the staff has had some training in handling this type of injury. On arrival, shock if present must be treated, and plasma or whole blood is the best treatment. If whole blood is used then the Rh factor must obviously be taken into consideration as some of these patients will require many transfusions before they have been rehabilitated.

The patient is put to bed on a firm, spring-filled mattress, and the weight of the bed clothes is kept off his legs by a cradle. A board is placed at the foot of the bed against which his feet can rest, to prevent the development of foot-drop deformities.

Consideration must now be given to treatment of the urinary tract. In this stage the bladder is completely atonic, and if left to itself it would fill until overflow incontinence appeared. Infection soon appears in an overdistended bladder such as this. If a catheter is inserted and left in as a drain, infection is almost inevitable, and a permanently contracted bladder, with a very small capacity may result. Intermittent catheterization is best avoided as infection will almost always result. A suprapubic cystostomy is unnecessary. If the patient must be transported some distance, a sterile catheter should be inserted and fastened into place, but if the distance be short no catheter is necessary.

The treatment of choice is that which will approximate the normal state of the bladder, allowing it to fill to physiological limits, and then to empty completely. This is accomplished by means of the tidal irrigator⁴. A small catheter No. 16-18 Foley type is inserted and this is changed every ten days. The tidal irrigator is attached, and the irrigation solution used is the "G" solution. This is acid in reaction, and is designed to inhibit the growth of organisms, and to help prevent the deposition of alkaline crusts in the bladder.

The patient must have special nursing care. He must be turned every two hours with careful avoidance of any torsion or flexion of the spine. This requires the help of more than one attendant. The sheets must be left tightly drawn and all crumbs, wrinkles or other uneven places kept out of the bed, as pressure sores can develop

with dismaying rapidity if care is not taken. Patients are bathed daily and the skin is carefully inspected for any areas of redness. If these are found they must be protected from further pressure until they have healed, otherwise a pressure sore will appear there. The areas particularly prone to develop these sores are over the sacrum, greater trochanters, anterior superior iliac spines, and heels. Any heating apparatus must also be used with caution, as they burn easily. Plaster casts are poorly tolerated, and hence it is useless to apply them.

One question that is raised at this point is: Should there be an immediate exploratory laminectomy? It has been the feeling in the past that little was gained by early operation, and this was undertaken only in the presence of a positive indication. Recently, however,¹⁰ "Operation was performed promptly in all proven or suspected cases of spinal cord injury chiefly because exploration proved to be the only sure way of determining whether or not the condition could be relieved surgically."

When operation was done within five days of injury 57% showed subsequent improvement, whereas if done after this time only 10% improved. Needless to say the operation should be undertaken only by an experienced neurosurgeon.

The bowels may worry those inexperienced with this type of case. During the first days, the intestines are completely atonic, the patient has no movements, and abdominal distention appears. It is useless to flog a completely atonic bowel with laxatives. These merely irritate, and enemas are little better because they are generally retained. A wiser course is to insert a rectal tube, and do nothing more until the appearance of peristaltic sound and the passage of flatus give evidence of the return of tone. This generally takes about a week. After this time enemas can be begun, and these should be administered every second day.

Daily physical examination is necessary during these days, as fever is almost always present, and chest, genitourinary or skin complications may appear at any time. Acute epididymitis and periurethral abscesses may appear, but these seem to be related to instrumentation such as cystoscopy, and hence such procedures should not be undertaken indiscriminately.

During the first few days intravenous alimentation will probably be necessary, but soon the patient will be able to eat, and it should be seen that he does eat. Too often the diet sheet shows that the patient is served with three thousand calories a day but returns most of it to the kitchen uneaten. The diet should be high in calories, high in protein, and with vitamin supplements. The fluid intake should be at least 4,000 cc. per day.

Intravenous pyelograms should be done at frequent intervals during these first months as 25% of cases develop renal stones, and these recumbency stones can appear as early as one month after the patient is confined to bed¹¹. If detected in early stages they may be removable without sacrificing the kidney. An expert urologist is required for these genito-urinary complications.

As a rule, routine urinalysis is done twice a week, and the urine is cultured at frequent intervals. At one time we also gave large doses of nitrohydrochloric acid by mouth. By giving acid and producing an acid-reacting urine, cultures will show that *B. proteus* and *B. Coli* are reduced in incidence. Without acid therapy, the urine tends to be alkaline, and *B. proteus* and *B. Coli* tend to predominate over and to replace the other colon group of organisms generally found. However, the incidence of fever is neither greater nor less, whatever the organism, and it would seem that there is little significance to be attached either to urine cultures, or even perhaps to urinalysis. It is probably a good thing to give acid therapy intermittently in order to discourage the organisms growing in the bladder, and also to reduce the tendency to deposition of alkaline crusts or stones in the bladder. We have found that the erythrocyte sedimentation rate is a much better guide to the presence of latent renal infection than either culture or urinalysis.

Early psychotherapy is also important¹². These patients naturally want to know the ultimate outcome, and they must be told the truth—that many paraplegics have recovered completely and that there is no way of telling in the early stages who will and who will not recover. They should also be told that even completely and permanently paralyzed persons can be made ambulatory and can lead a happy life.

About a month after injury the stage of cord shock begins to wear off, and some evidence of cord function appears. This must not be viewed with too much optimism, because the return of some motor power does not mean that complete recovery will necessarily occur. For example, a man was injured by a bullet which passed by his spinal cord at the fourth thoracic level. He was at once paralyzed, the paralysis involving his arms and hands and clinically extending to the sixth cervical level. One month later power began to return to his hands and arms, but he has never regained any function below the level of the fourth thoracic level. The explanation for this must be that the cord between the sixth cervical and fourth thoracic levels was concussed, but the damage was repairable, whereas at the fourth thoracic level permanent and complete damage was suffered.

Physiotherapists have been working on these patients from the first, keeping muscles in good

condition by massage, and preventing the development of contractures or joint deformities. Electrical stimulation of paralyzed muscles is also done. As muscle power reappears the recovering muscles are carefully watched and graduated exercises are undertaken to improve the strength. An overhead bar is fitted on the bed, so that the patient can use his arms to raise himself and assist in nursing care, and also to develop the muscles of his upper extremities.

As spinal shock passes off, muscle spasms may appear. These are generally flexor in type, and if associated with evacuation of bowel or bladder are called the Mass Reflex. We have not experienced the mass reflex among our patients. The flexor spasms are common, and are to be deplored because the patient cannot rest properly, any slight stimulus to his skin resulting in involuntary flexion of his lower limbs and hence, in severe cases, in almost constant movement. Bed sores are soon found over bony prominences, and eventually the legs may become permanently drawn up and ankylosed there, so that the patient will never be able to sit up properly or to walk. Once these spasms appear they seem to have little tendency to disappear, but will subside temporarily during a period of urinary tract infection. The appearance of these flexor spasms almost always mean that the patient is a complete and permanently complete paraplegic. Flexor spasms must not be confused with the clonic spasms that are seen in spastic, incomplete lesions. Drugs have very little effect on the flexor spasms. Curare has been used, but large doses are required and the patient feels miserable with it, so that at best it is to be used only to tide him over a difficult period^{14, 15}. We have tried quinine because it has a curare-like action¹⁶, but it was ineffective. Physostigmine has no effect, and the barbiturates are of little aid. Eventually in most cases section of the anterior nerve roots will have to be done (anterior rhizotomy)¹⁷. The operation is not an easy one.

Some bed sores may become so extensive that spontaneous healing is impossible. Then plastic repair is required. This is generally done by the sliding flap method¹⁸. It is remarkable how some men appear to be rather immune to the development of pressure sores, whereas others produce them with disheartening ease.

Flare-ups of fever are very common during the first months, and are almost always due to an acute pyelonephritis. Any slight change may precipitate one of these flare-ups: emotional upset, failure to maintain fluid intake, upper respiratory infection, sudden weather change, blocking of a catheter for a short time, etc.

The organisms found in the urine during these periods are the same as those found during quiescent periods. These attacks are treated by

increasing the fluid intake, and generally penicillin and sulfonamides are given. However the organisms found in the urine are generally resistant to both of these drugs and it is questionable whether or not such treatment makes any difference. As long as there is no obstruction to drainage of urine and the patient maintains his fluid intake (or receives it intravenously), the fever will generally subside within a week. When after the passage of months the bladder automaticity has been regained the patient has put on weight, and is able to be out of bed, the incidence of these episodes decreases, and the sedimentation rate reaches normal levels. The patient then appears to have made peace with his harboured organisms, and will go on for years without further flare-ups.

Once the patient is free from extensive bed sores, flexor spasms and recurrent bouts of fever he is ready for the first step towards rehabilitation. By this time bladder automaticity will have appeared, and the development of this type of bladder can be followed by doing periodic cystometrograms¹⁹. An automatic bladder is one that fills to a certain capacity and then empties itself automatically. Depending on the completeness of the lesion there are varying degrees of bladder sensation. Patients have a short period of warning before the bladder empties but have no control, others with less cord damage have varying degrees of bladder control, but patients who have suffered complete section of the cord have no warning and no control.

The first step towards rehabilitation is to get the man out of bed. A wheel chair is needed, and a collapsible wheel chair is available (Everest and Jennings) which can be folded up and put into the back of a car. The patient must be able to leave his tidal irrigator behind him. At first the catheter is clamped off for two hours, and then unclamped and the bladder stimulated to empty by massage or pressure suprapubically²⁰. At night the tidal apparatus is again attached. The period should be lengthened until the urine can be held for three hours. In this way patients can train their bladders to empty at three-hour intervals on certain stimuli. Later the apparatus can be dispensed with at night; many patients will be able to go through the night without having to empty their bladders, but others will not. These latter can either be awakened by nurse, or later by alarm clock to empty their bladders, or can sleep on soakers to collect urine.

When they are up and about most of these patients will require some form of urinal which can be worn, and the Davol No. 5 has been the most satisfactory but no completely satisfactory urinal has been found.

Once out of bed these patients can be taught how to give themselves enemas. About half of them can get along without enemas, if they experi-

ment with different combinations and strengths of laxative and go to the toilet at a definite period each day and attempt to stimulate a bowel contraction by massage over the abdomen.

Patients should also learn to bathe themselves daily, and a bath is preferred to a shower, as there is less danger of being burned because of sudden change in water temperature. A rope ladder suspended from the ceiling is a help to them in enabling them to get in and out of the tub, and also one over the toilet, to allow them to swing on and off and administer the enema.

Mat classes are begun now, and gymnastic exercises are given to develop upper extremity muscles. Splints are fitted, and the excellence of these depends on the expertness of the splintman. The splints consist of two metal bars which fit into the heel of a boot, which is like a hockey boot, lacing all the way to the toes so that the patient's toes can be properly arranged in the boot. The two bars are joined by padded half-circles of metal, and straps complete the circle which surrounds the limb and holds it in the splints. A lock is made at the knee, to hold the splints rigid when the knee is extended, but there is a tripping attachment, so that when the patient wishes to sit down the knee lock can be undone and hence the splints allowed to bend at the knee.

Once he has his splints and his crutches, the man can now be taught to walk, swinging his legs, pendulum fashion, by means of the muscles of his back and upper extremities. Several gaits are taught, each having its particular use⁸. They can be taught to go up and down stairs and up and down curbs.

During all this time and indeed for the rest of his life, he must be constantly on his guard, inspecting his skin each night and morning for evidence of pressure sores, maintaining his fluid intake, and watching for any evidence of genitourinary sepsis, which is the main threat to his life. He is now on a routine, arising in the morning and dressing, putting on his splints, after having the routine of enema, bath, etc. He should rest each afternoon, with the splints off, and again later in the day.

Attention can now be paid to learning a future occupation. This will have to be something that can be done sitting down. Watch repairing has been a popular occupation, as well as other handicrafts, but there is almost no limit to what can be done. Some men are in business, managing restaurants, selling insurance. Others are going back to University to complete studies and eventually go on to drafting, writing or other occupations. They can get about in cars which are fitted with modifications allowing them to drive. The goal in all cases is to have these

patients returned to a useful life and to avoid having them as permanent hospital inmates. Many have already left to return to their homes and families, and all of these have invariably done well there. Many were men who had married before their injuries occurred, but a few others have taken the matrimonial plunge since they were injured, and these have found in this state a companionship of the greatest value.

It is hoped that this very rough outline has indicated how very much can be done for the paraplegic patient. The same principles can also be applied to "polio" victims, and other victims who have not much power in their lower extremities. Many of us tend to be too defeatist in outlook when faced with the problem of handling the "cripple".

The paraplegics have organized themselves into a nation-wide association, have their own offices, and publish their own paper ("The Caliper"). So far the members are mainly service personnel, but the Americans estimate that there are eight times more civilian than military paraplegics who could, and certainly should, benefit by the experience which has been gained in handling the paraplegics who have been injured in the Service. Civilian paraplegics can become members of the "Canadian Paraplegic Association" by writing to the head office in the Maple Leaf Gardens Bldg., Toronto, Canada.

Bibliography

1. Elsberg, Charles A., *Surgical Diseases of the Spinal Cord*. (Paul Hoeber Inc., 1941.)
2. Munro, Donald, *The Rehabilitation of Patients Totally Paralyzed*. 1. Anterior Rhizotomy for Spastic Paraplegia. *New England Journal Medicine*, 233; 453 (1945).
3. Munro, Donald, *The Treatment of Patients with Injuries of the Spinal Cord and Cauda Equina Preliminary to Making them Ambulatory*. *Clinics*, IV-2, Aug., 1945, p. 448.
4. James, D. F., Braden, S., *Journal of Neurosurgery*, 3: 74, Jan., 1946.
5. Harvey, A. M., *Bull. John Hop. Hosp.*, 66: 52, 1940.
6. Munro, Donald, *The Rehabilitation of Patients Totally Paralyzed*. 2. Control of Urination. *N. E. Jour. Med.*, 234: 207, 1946.
7. Howard, Parsons and Bigham. *Bull. John Hop. Hosp.*, Oct., 1945, p. 291.
8. Deaver, Geroe G., Brown, May, Eleanor. 1. *Methods of Crutch Management*. *Arch. Phys. Med.*, July, 1945. 2. *Crutch Walking - Muscle Demands and Preparation*. *Ibid.*, Aug., 1945, p. 515. 3. *Standard Crutch Gaits, How to Teach Them*, *Ibid.*, Sept., 1945, p. 573.
9. Swartz, D. *The Neurogenic Bladder in Spinal Cord Injury*. *C.M.A.J.*, 54:333, 1946.
10. Kirk, N. T. *The Remaining Task*. *J.A.M.A.*, 130: 918, 1946.
11. Flocks, R. H. *Early Calcium Urolithiasis*. *J.A.M.A.*, 130: 913, 1946.
12. Thom, et al. *Psychological Aspects of the Paraplegic Patient*. *Med. Clin. N. A.*, March, 1946.
13. Poer, Col. D. A. *Newer Concepts in the Treatment of the Paralyzed Patients Due to War-Time Injuries of the Spinal Cord*. *Ann. Surg.*, 123: 510, 1946.
14. *Ibid.*, 123: 516.
15. Barker et al. *Methods of Closure of Decubitus Ulcers*. *Ibid.*, 123: 523.

Section of Anaesthesiology

P. C. Lund, M.D., Anaesthetist, Deer Lodge Hospital

Abstracts

Platou, E. S.: Pre-operative and Post-operative Management of the Poor Risk Infant or Child. *Minnesota Med.* 28: 29-32 (Jan.), 1945.

"Proper management of the 'poor risk' surgical patient challenges the profound judgment of men in almost every field of medical practice.

"Compared to the adult, the surgical patient in his early life has additional hazards due to the factors of immaturity, growth and development. His immaturity in the first few months and years of life is characterized by unusually active physiologic processes, rapid metabolism, and relative instability with respect to water, acid-base, and nitrogen equilibrium. He is less capable of compensating for blood loss as well as to any tax on his heat-regulatory mechanism. Compared to the adult, his 'margin of safety' is therefore appreciably reduced. The principal causes of a 'poor risk' status in infancy and early childhood can be briefly stated as follows: (1) Developmental (immaturity, congenital anomalies), (2) Nutritional (hypoproteinemia and starvation), (3) Metabolic (water balance dehydration or edema), electrolyte balance (acidosis, alkalosis), endocrine balance (thyroid, diabetes), (4) Deficiency (vitamins, minerals, tissue), (5) Infections (active, anticipated contagion), (6) Traumatic (injuries, burns), (7) Allergic (asthma, edema), (8) Mechanical (foreign bodies, obstructions), (9) Psychic.

"It is well known that chronic infections often cause a depletion of protein in the body. Nutritional deficiencies may likewise cause a lack of protein in the form of albumen. Plasma can materially help to combat chronic infection and hypoproteinemia. For the correction of hypoproteinemia or hypoalbuminemia, amino acids have been said to be effective.

"Experimental and clinical proof of their ability to restore plasma proteins and achieve positive nitrogen balance has been presented. Their principal indication intravenously is in nutritional deficiency although they have, like plasma, also been found effective in subacute conditions with loss of plasma into the peritoneum in peritonitis, and into the bowel wall in obstruction. Both have been employed in hepatic insufficiency and nephrosis.

"The small child has a greater percentage of water in his body than the adult and a greater portion of this is extracellular (i.e., intravascular and interstitial), where it serves to maintain plasma volume. He, therefore, often loses proportionately greater amounts of fluid during

dehydration than an adult. Prompt fluid replacement and maintenance are therefore more urgent in the sick child. In the case of simple dehydration, normal saline and glucose or Hartman's solution may be employed.

"If protracted vomiting has been a prominent symptom in a child, alkalosis is suggested by the occurrence of shallow respiration, hypertonicity, lack of chloride excretion, and a high plasma bicarbonate level. The therapeutic need in this circumstance is saline solution, and calcium gluconate or chloride followed by plasma, or blood intravenously.

"If diarrhoea, with loss of basic intestinal secretions, has occurred, reduction in plasma bicarbonate may have reached an extreme. Hemocytocentration and circulatory stagnation then cause impaired renal function. Exhaustion of carbohydrate reserve and anoxemia permit intermediate products of fat metabolism and acid to accumulate in the blood.

"The resulting acidosis, if unchecked, may then lead to an increase in capillary permeability and be manifested by stupor, hyperpnea and symptoms of shock. Such a seriously altered physiologic state can best be corrected by the intravenous administration of glucose and buffered sodium lactate or sodium bicarbonate, followed by a protein colloid such as plasma. Dehydration, antiketosis, restoration of carbohydrate reserve and plasma volume are thus brought about. Restitution of plasma volume will tend to increase renal function. Fluid containing buffer substances may then be held in the blood stream so that the selective action of the kidney may come into play and a sustained trend toward proper water and electrolyte balance can be achieved.

"From a relatively simple beginning, any one or a combination of these altered physiologic conditions accelerated by infection or other factors may rapidly approach a critical state. Much of the mechanism of secondary or "medical" shock then develops.

"More dramatic and urgent than secondary or medical shock is the rapidly progressive primary shock precipitated especially by trauma, hemorrhage and burns. Obviously, no comprehensive formulæ can be evolved to determine the requirements of all factors in a mechanism so complex and precipitated by so many causes as the failing circulation of the sick child. Clinical judgment to determine the need for specific and group antibodies, for fluids, for electrolytes, and for protein sufficient to maintain an adequate circulating blood volume is all-important. Evaluation of hydration, determination of plasma protein,

bicarbonate and chloride, the number of red cells, the hemoglobin, hematocrit, and specific gravity of the blood are invaluable adjuncts.

"The dosage of human plasma and serum must depend on the weight of the child and the seriousness of the condition for which it is to be employed. In chronic infections and hypoproteinemic states, doses should be gauged to accomplish physiologic levels of plasma proteins.

"One should not fail to mention the use of high vitamin intake, specific drugs, oxygen, tubes for decompression, and careful judgment in the choice of anesthetic and time of operation. A cannula in a vein for prompt use of plasma, especially during operations on the brain or thorax, may be life saving."

P. C. I.

Abstract

Burdick, D. L., and Rovenstine, E. A.: Picrotoxin in Barbiturate Poisoning, *Ann. Int. Med.* 22: 819-826 (June), 1945.

"It is a foregone conclusion that the patient suffering from deep barbiturate depression should be afforded every advantage favoring rapid and complete recovery. The following regime summarizes the accepted procedures essential to proper handling of such cases. The condition of the patient when first seen and the response to therapy is, of course, to be used as an index in each individual instance. An adequate airway must be established immediately and maintained throughout. Oropharyngeal toilet to remove all secretions is best accomplished by suction, to be repeated whenever necessary. A nasoendotracheal airway is always indicated for the comatose patient in whom cough and swallowing reflexes are absent.

"Artificial respiration may be necessary in bradypnea or when very shallow respiratory excursion are present. This is not usually required for any prolonged period if analeptic therapy is not delayed. Oxygen by a properly placed, correct type of oropharyngeal catheter at a flow of six liters per minute affords an adequate concentration at the alveoli.

"Gastric lavage is performed to remove any remaining drug and to empty the atonic stomach. The contents are analyzed for barbiturate. Catharsis is advocated in some clinics, leaving 300 cc. of sodium sulfate in the stomach for this purpose. The possibility of regurgitation and aspiration of gastric contents is a real danger in an intubated, comatose patient, hence it is preferable to have the stomach completely empty rather than risk this complication. Tube feeding is condemned for the same reason. Analeptic therapy should be conservative if reflexes are active and motor activity present.

"Vigorous treatment is for the deeply depressed patient. In such cases picrotoxin may be given in 0.001 to 0.003 gm. doses intravenously, or in 0.003 to 0.006 gm. doses intramuscularly every 15 minutes until the desired response is attained. This fractional method is not so effective as the continuous procedure, which is equally safe if employed with proper caution. The drug is administered at the rate of 0.001 to 0.002 gm. per minute until the corneal, swallowing or other reflexes appear, or until slight twitchings of the facial muscles occur. If given beyond this point convulsions may result. These usually are of a mild nature and gradually subside as the stimulant is destroyed. Should they be severe, or should milder ones maintain, an intravenous barbiturate such as sodium pentothal is given slowly just to the point of control. Once signs of reflex and motor activity return picrotoxin is continued intramuscularly in maintenance doses of 0.003 to 0.006 gm. each 15 to 30 minutes as indicated. Should regression develop the same dose is given intravenously until the desired plane of activity is re-established. Each case must be treated individually and the drug continued until active reflexes and involuntary movements are maintained.

"Since the action of picrotoxin may be delayed for as much as 10 minutes, caution is to be exercised in its administration. Furthermore, the impression has been gained that the initial response to picrotoxin following depression from the longer acting barbiturates is slower than is the case with the shorter acting ones, hence the analeptic should be given in smaller amounts if its accumulation with a resultant sudden and severe stimulation is to be avoided. Convulsions, if they occur, usually are followed by a degree of depression deeper than that existing before their onset.

"The amount of picrotoxin necessary to establish the desired plane of activity is unpredictable. The wide variation in dosage seemingly bears little relation to the quantity of barbiturate taken. Although 0.02 gm. of picrotoxin is dangerously toxic to a normal adult, doses ranging from 1.079 to 2.296 gm. have been employed for patients poisoned by barbituric acid derivatives. Intravenous fluid therapy should not be delayed.

"Chemotherapy is instituted should signs of pneumonia or other intercurrent infection appear.

"Diuresis may be enhanced by intravenous fluids and diuretics should depression of urinary output occur. Many patients are incontinent, although others may require catheterization every 10 hours to prevent bladder distention and to be certain that kidney function is adequate. Nursing care must be of the best with constant attention

to all details, if good results are to be obtained. Oral hygiene, padding of pressure points to avoid decubitis, protection of the frequently appearing bullae, reduction of marked hyperthermia and protection of the patient against injuries once

motor activity is resumed warrant special emphasis. Once consciousness returns psychiatric problems may arise which will require expert handling by both the physician and nurse."

P. C. L.

Something Old

On Feasting

Sittest thou at a great table? Be not greedy upon it, and say not, Many are the things upon it. Stretch not thine hand whithersoever it looketh, and thrust not thyself with it into the dish. Consider thy neighbour's liking by thine own; and be discrete in every point. Eat, as becometh a man, those things which are set before thee; and eat not greedily lest thou be hated. Be first to leave off for manners' sake; and be not insatiable lest thou offend. And if thou sittest among many, reach not out thy hand before them. How sufficient to a well-mannered man is a very little, and he does not breathe hard upon his bed. Healthy sleep cometh of moderate eating; he riseth early and his wits are with him; the pain of wakefulness, and colic, and griping, are with an insatiable man. And if thou hast been forced to eat, rise up in the midst thereof, and thou shalt have rest. Hear me, my son, and despise me not, and at the last thou shalt find my words true: in all thy works be quick and no disease shall come unto thee.

Shew not thyself valiant in wine, for wine hath destroyed many; the furnace proveth the temper of steel by dipping, so doth wine prove hearts in the quarreling of the proud. Wine is as good as life to men if thou drink it in measure: what life is there to a man that is without wine? and it hath been created to make men glad. Wine drunk in season and to satisfy is joy of heart, and gladness of soul: wine drunk largely is bitterness of soul, with provocation and conflict. Drunk-

ness increaseth the rage of a fool unto his hurt; it diminisheth strength and addeth wounds.

Rebuke not thy neighbour at a banquet of wine, neither set him at naught in his mirth; speak not unto him a word of reproach, and press not upon him by asking back a debt. Have they made thee ruler of a feast? Be not lifted up, be thou among them as one of them; take thought for them and so sit down. And when thou hast done all thy office, take thy place, that thou mayest be gladdened on their account, and receive a crown for thy well ordering. Speak, thou that art the elder, for it becometh thee, but with sound knowledge. And hinder not music: pour not out talk where there is a performance of music, and display not thy wisdom out of season.

As a signet of carbuncle

In a setting of gold,

So is a concert of music in a banquet of wine.

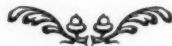
As a signet of emerald

In a work of gold,

So is a strain of music with pleasant wine.

Speak, young man, if there be need of thee; yet scarcely if thou be twice asked; sum up thy speech, many things in a few words; be as one that knoweth and yet holdeth his tongue. If thou be among great men, behave not as their equal; and when another is speaking, make not much babbling. Rise up betimes, and be not the last; get thee home quickly and loiter not; there take thy pastime, and do what is in thy heart; and sin not by proud speech.

Ecclesiasticus 31:12 - 32:12.





for the epileptic...
calm without the storm

Tridione, Abbott's new synthetic drug, has been shown by clinical tests to be effective in the treatment of petit mal seizures in which other drugs have proved ineffective. • In one series of tests¹ Tridione was given to a group of 50 patients subject to petit mal, myoclonic or akinetic seizures not helped by previous medication. In a period of days to weeks, these seizures ceased in 28 percent of the cases, were reduced to less than one-fourth of the usual number in 52 percent, and were little affected in 20 percent. In several patients the seizures once stopped *did not return* when medication was discontinued. Tridione also has had a beneficial effect in the control of psychomotor seizures in a certain proportion of cases.²

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Literature on Tridione will be mailed on request.

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(1) Lennox, W. C. (1945), *Petit Mal Epilepsies: Their Treatment With Tridione*, J. Amer. Med. Assn., 129:1069, December 15.
(2) DeJong, R. N. (1946), *Effect of Tridione in the Control of Psychomotor Attacks*, J. Amer. Med. Assn., 130:565, March 2.

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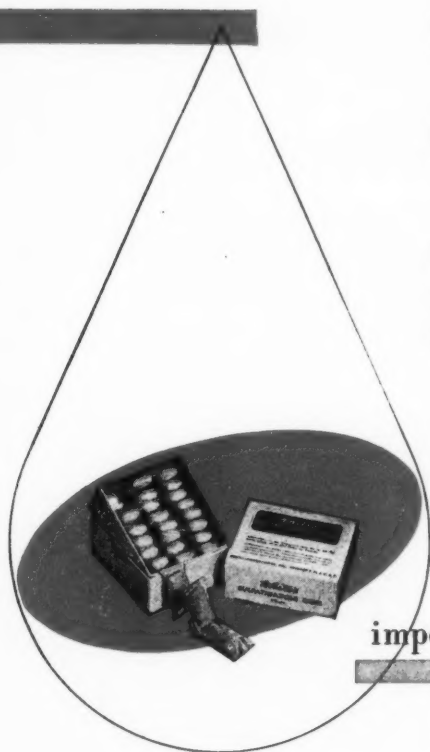
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Sulfathiazole gum

Manitoba Medical Association

(Canadian Medical Association, Manitoba Division)

Tentative Annual Meeting Programme

. . .

Sunday, September 22nd

Afternoon

3.00 Royal Alexandra Hotel: Executive Meeting.

Monday, September 23rd

Morning

Winnipeg General Hospital:

9.00 Medical Cases.

Dr. L. G. Bell, Winnipeg, Chairman.

10.30 Surgical Cases.

Dr. Oliver Waugh, Winnipeg, Chairman.

12.30 Luncheon: Royal Alexandra Hotel.

Guest Speaker, George M. McConnell,
Vice-President, Manitoba Pool Elevators,
"What Rural Manitoba Expects of Medicine."

12.30 Registration: Royal Alexandra Hotel.

To facilitate registration and the distribution of buttons before the Scientific Session begins at 2.15 p.m., your co-operation is requested by registering as early as possible.

Afternoon

2.15 Scientific Session,

Dr. John Gunn, Winnipeg, Chairman.

Surgery in Peptic Ulcer,

Dr. Roy Huggard, Vancouver.

2.45 Chronic Cases of the Liver,

Dr. J. A. Dauphinee, Toronto.

3.15 Glaucoma, Dr. A. J. Elliott, Toronto.

3.45 Intermission:

Visit the Scientific and Commercial Exhibits.

4.00 Effects of War on Civil Practice,

Dr. John Kilgour, Winnipeg.
Dr. M. R. MacCharles, Winnipeg.

Evening

7.00 President's Dinner to Retiring Executive.
Royal Alexandra Hotel:

Tuesday, September 24th

Morning

Royal Alexandra Hotel:

9.00 Business Meeting. Voting by Ballot
(Until Thursday Noon).

12.30 Luncheon:

Guest Speaker, Dr. Wallace Wilson,
Vancouver, President of the Canadian
Medical Association.

Visiting Speakers

Dr. J. A. Dauphinee, Toronto,
Internal Medicine.

Dr. A. J. Elliott, Toronto,
Ophthalmology.

Dr. Roy Huggard, Vancouver,
Surgery and Cancer.

Dr. Wallace Wilson, Vancouver,
President of the C.M.A.

Afternoon

Royal Alexandra Hotel:

1.30 Visit the Scientific and Commercial Exhibits.

2.00 Business Meeting.

Evening

Royal Alexandra Hotel:

8.00 Business Meeting.

Ladies' Programme

There will be plenty of private social activities, so that no one should hesitate about accompanying their husbands for fear of lack of entertainment.

There will be representatives of the Ladies' Committee at the registration desk. Please leave your name, city address and telephone number. The Ladies' Committee will see that you are kept in touch with all its activities.

Winnipeg, September 23, 24, 25, 26

Headquarters First Floor

Royal Alexandra Hotel

. . .

Wednesday, September 25th

Morning

St. Boniface Hospital:

9.00 Medical Clinics,

Dr. D. S. McEwan, Winnipeg, Chairman.

10.30 Surgical Clinics,

Dr. A. C. Abbott, Winnipeg, Chairman.

12.30 Luncheon: Royal Alexandra Hotel

(Guest Speaker to be announced).

Afternoon

Royal Alexandra Hotel:

2.00 Visit the Scientific and Commercial Exhibits. Scientific Session.

Dr. Charles Hunter, Winnipeg, Chairman.

2.15 Treatment of Cancer of Colon.

Dr. Roy Huggard, Vancouver.

2.45 Antibiotic, Dr. J. A. Dauphinee, Toronto.

3.15 Cysts of the Ovary.

Doctors J. D. McQueen and D. Nicholson, Winnipeg.

3.45 Intermission:

Visit the Scientific and Commercial Exhibits.

4.00 Maternal and Child Hygiene.

Dr. Hutton, Federal Department of Health, Ottawa.

4.30 Ophthalmic Indications of Systemic Disease.

Dr. A. J. Elliott, Toronto.

Evening

8.15 Public Meeting: Grace Church.

Dr. P. H. McNulty, Chairman.

Cancer is Curable.

Dr. Roy Huggard, Vancouver.

Thursday, September 26th

Morning

Deer Lodge Hospital:

9.00 Medical Clinics,

Dr. John Kilgour, Winnipeg, Chairman.

Annual Golf Tournament

1.30 Elmhurst Golf Links.

This year's Golf Tournament for the Manitoba Medical Association Trophy and other prizes will be played over the picturesque and tricky Elmhurst Golf Links, where golfers who delight in variation will derive great pleasure in mastering the rolling, uphill, down dale fairways on this beautiful layout. Transportation will be arranged. Forward your entries immediately to the Golf Committee, stating handicap. Only members residing within the Province will be eligible to compete for the M.M.A. trophy.

Commercial Exhibits

This year's Commercial Exhibit display will be the largest, most varied and interesting we have been able to assemble heretofore. Canada's leading Pharmaceutical, Biological, Surgical Equipment and X-Ray manufacturers will be represented by officials and attendants who will gladly impart detailed information on their particular products.

Surgical Clinics,

Dr. C. E. Corrigan, Winnipeg, Chairman.

Annual Dinner and Dance

6.00 Royal Alexandra Hotel.

This year's Annual Dinner and Dance will be our first festivity since pre-war days. Feasting, Renewing Old Acquaintances and Dancing to the strains of good music amid an atmosphere of congeniality, will lighten the burdens of the heart and provide an evening of gala entertainment for you and your escort.

It is suggested that reservations be made well in advance, as the accommodation available is limited. Dress: Optional. Tickets, per couple, \$6.00.

6 p.m. Cheer de Cup
7 p.m. Banquet, 9 p.m. Dancing.

Royal Alexandra Hotel Rates

Headquarters for the Annual Meeting are at the Royal Alexandra Hotel. Every comfort and courtesy that modern facilities and efficient personnel can give, will be provided at reasonable rates to help make the Convention an outstanding success. Arrange for your reservation early by writing direct to the Hotel or to the Association.

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The pregnant woman truly has a "whim of iron." And when she gets a longing for pickles (usually at 3 a.m.) even the strongest-minded find it simpler to just go and get them for her.

The addition to her diet of Squibb Viophate "D" helps to counteract the

effect of these whims of the mother and makes more certain the development of a healthy baby. 2 capsules of Squibb Viophate "D" 3 times daily conveniently afford a total of 7.8 grains of supplementary calcium (about half the daily requirement) with sufficient vitamin D to assure its utilization.

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Editorial

J. C. Hossack, M.D., C.M. (Man.), Editor

The Convention

This is, as you know, Convention Month. There is every evidence that the meetings will be well attended but no one need fear that there will be no room for him and stay away on that account. This will be a very special occasion. It is the first real peace time convention for a long time and during that time friends have been widely separated. So this will be an opportunity to renew old friendships and to meet new colleagues. It is also an opportunity to rest or, at any rate, to get the change that is as good as a rest. And this is not the least of the benefits one derives from attending our annual meeting. It is a relief to get away from leaky, backache, belly-aching old women and troublesome old gentlemen whose lives of unsuccessful effort fall into two periods: the first, trying to make money; the second, trying to make water. So come to Winnipeg and get away from bowels and bladders, from pelvis and prostates, from Mrs. Schmaltz and her doshay bolette, from women whose chief trouble is their husbands and from husbands whose ailment is married to them. They are all very nice people but, for a while, they will be nicer at a distance. Come and enjoy yourself.

There will, of course, be feasting; and for the occasion I am setting forth in another place what an ancient physician had to say about that. His name was Jesus, the son of Sirach, and he is the author of the apocryphal book "Ecclesiasticus". It would seem that Jesus had his own ideas about good manners and that these ideas were not always shared by those with whom he shared the feast, hence this anticipation of the magnum opus of Emily Post. It is obvious, also, that he had no use for long winded chairmen, and in times past, when circumstances laid upon me the responsibility of being "ruler of a feast" I sometimes uttered, but always obeyed, his injunction: "Have they made thee ruler of a feast? Be not lifted up, be among them as one of them; take thought for them and so sit down." Those words should be before the eyes of every chairman. What else the Son of Sirach has to say about feasting you will find under "Something Old".

In addition to feasting, resting and amusement, there is business to attend to. These, as everyone must agree, are critical years. It is true that your affairs are in faithful, competent and diligent hands but after all your representatives are only that; they are working for you and speaking for you but, if you are to be satisfied, you must tell them for what to work and what to say. If you appreciate their efforts, and you should, you can best show that appreciation by being will-

ing to attend, and to take part in, the business meetings.

Having now disposed of those things which concern the body we conclude with reference to the things which concern the mind. Dr. Adamson and his committee have for long been at work preparing what they believe to be a programme especially suited to the needs of today. You will find the complete programme elsewhere.

The Election

On more than one occasion during the past year we have urged that there be an open meeting of the College of Physicians and Surgeons. There were we felt, many important matters which required free discussion and we suggested the Convention Week as a convenient time to hold such a meeting. But there is little likelihood that a meeting will be held and therefore we shall draw attention to certain facts which deserve, if indeed they do not demand, consideration.

We are now in the midst of an election. Nominations have been made and in a short time we shall be asked to mark our ballots. These ballots will be sent to the Registrar (who may himself be a candidate) and by him will be given to two scrutineers who also may have been nominated. These, when they have counted the ballots, will inform the Council of the names of the successful contenders. The scrutineers will not tell the total number of votes cast, or for whom they were cast, or the majority of any candidate. They will merely state the names of those whom they declare elected. No candidate will be told how well or how badly he fared and there will be no recounts. What may be the procedure in the case of a tie, I do not know. After the results have been reported the ballots will be destroyed. No record of any sort will be kept apart from the names of the new councillors. This is the secret ballot par excellence for it confines the secret to two persons. Those upon whom lies the responsibility of scrutineer had need be veritable Bayards, sans peur et sans reproche. They had need be like Calbournia, above suspicion. They had need be infallible for should they err there is none to detect their error. They had need be tireless for there may be 700 ballots to count. Such responsibility is too much to lay on two scrutineers. It is also too much to satisfy 700 voters or any candidate. A more peculiar or unsatisfactory method of election, or one more open to criticism cannot be imagined.

Congenital anomalies seldom occur singly and so it is with the peculiarities of our College. Not

only is the method of election almost eccentric but the distribution of representation is equally absurd. How many voters there may be in each electoral district we do not know. The Registrar was asked for the information but said that to give it would be an infraction of the Act! We know, however, that in Selkirk Constituency there are 28 members of the College with one representative; in North Winnipeg 37 members with two representatives, and in South Winnipeg 324 members with two representatives. I have been told, I know not with what truth, that there is a district with only two members one of whom is elected. Whether or not the latter is the case is not of great importance. From the other figures it is obvious that representation is nowhere proportional, for the North Winnipegger has the eighteenth part of his representative while the South Winnipegger has but the one-hundred-and-sixty-second part of his. Yet in the Council the voice of North Winnipeg is as loud as that of South Winnipeg despite the fact that in medical population the one is little more than a tenth of the other.

If it be true that there is a two-member constituency then in that district it is possible for one man to spend twenty, thirty or even forty years as a Councillor. At the same time in another district 85% to 90% of the members are deprived of the slightest chance to serve on the Council. In every case the re-election of a representative prevents the infusion of new blood and the diffusion of offices among the members. Under such circumstances there can be neither enthusiasm nor interest but only stagnation. That this is true is shown by the apathy with which the members regard the doings of Council.

Yet the doings of Council are important and for them we must take the responsibility. At any time some matter of extraordinary importance may arise. At the moment we are not threatened with any schism in the profession but who can be certain that there will never be one? And in such a case how fair would be the decision when two men representing a score between them could out-vote one man who was backed by 160? It is better to make such a thing impossible than believe that it could not happen. Representation should be such that each member has an approximately equal voice in the affairs of the College. The College has a fortune of \$60,000 which it keeps and augments as a fund for use in some crisis. That such a crisis should arise is most unlikely and if it did the members would speedily subscribe all the money needed even if the treasuries were empty. But a change in representation could not be made with equal speed should the need arise. If it be wise to guard against the one contingency it would be at least equally wise to guard against the other.

These are two matters concerning the College which are pertinent for criticism at this time. To remedy the situation would require changes in the Act. There should be no objection to that. It has been called by some a good Act but is it? An Act that prevents the Registrar from divulging even trivial information; that permits an official to handle ballots when he is himself a candidate; that entrusts completely and without check all the details of voting to two men; that gives no candidate any information about his election results; that makes it possible for one man to serve a life time and impossible for many others to serve at all; that makes the voice of two members as loud as that of two hundred; that prevents members from seeing their council in action; that fails to insist that the elected report in person to their electors; an Act that does any of these things, and especially an Act that does them all is not a good Act and anyone who refers to it as good is speaking of it in a Pickwickian sense and as the curate who said of his egg, "Parts of it are excellent."

This is not a criticism of the members of Council. It is not the fault of the Registrar if he is nominated and elected. He is not to blame if the ballots must pass through his hands. But the holder of that office should be appointed, and the duration of his term of service should be determined, in some other way. Furthermore he should be free to give any member all the information at his disposal. Too much responsibility is placed upon the scrutineers. It is not a question of their honesty, which nobody doubts, but of the amount of secrecy where there should be none and of the absence of checks which the scrutineers themselves would welcome. Members who have been on the Council for 12, 16, or 20 years are in no way blame-worthy because their electors have continued them in office. But there are drawbacks as well as advantages in such long tenure of office. The greater the number of individuals who experience the responsibilities of office in College, Society or Association the better for the profession as a whole. Interest is stirred by opportunity to serve but it is stifled when opportunity is denied to all save a few, and it is killed when that few remains the same.

It is a fault of service on the Council that it carries with it only moral responsibility. The Members of Council do not ask for instruction when they assume office nor do they report to their electors when they relinquish it. How well we have been served we must learn in other ways than from the lips of our servants; and if we have been served well it is not because we have aroused a desire to serve well or taken an interest in the service given. It would be to the benefit of all if electors and elected took a keener interest in each other. They should do so now.

There are two other comments that I would make. One is that the present Medical Register is 16 years old and therefore almost worthless. The other is that no Annual Report for 1945 has been issued and it is now near the end of 1946. The material, however, has been published in the "Review." I am wondering if our slender resources are being used so that the hoardings of the College may remain intact.

Contributors in This Issue

Paul Green, B.A., M.D. (Tor.)

In Charge of Paraplegics, Deer Lodge Hospital.

J. M. Kilgour, M.D., M.R.C.P. (Lond.).

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Department of Pediatrics, Calgary Associate Clinic.

S. S. Peikoff, M.D., F.R.C.S.(E), F.R.C.S.(C).

A. A. Keenberg, M.D.

Report of Nominating Committee

August 16th, 1946.

To the Executive and Members of the
Manitoba Medical Association:

Sirs:

Your Nominating Committee has met and presents the following list of Candidates for your approval, according to Article II:

President:

Dicks, R. E., Dauphin
Martin, J. R., Neepawa

First Vice-President:

Richardson, R. W., Winnipeg
Walton, C. H. A., Winnipeg

Second Vice-President:

Evans, H. S., Brandon
Hamlin, G. H., Portage la Prairie

Secretary:

Funk, Henry, Winnipeg
Scott, D. L., Winnipeg

Treasurer:

Edmison, H. M., Winnipeg
Perrin, M. B., Winnipeg

Urban Member at Large:

Dandenault, A. G., Winnipeg
Hollenberg, A., Winnipeg

Rural Member at Large:

Corbett, C. A., Crystal City
Patterson, W. H., Holland

Respectfully submitted,

P. H. McNULTY, M.D.,

Chairman, Nominating Committee.

Obituaries

Dr. Oscar Chipman Dorman

Dr. Oscar Chipman Dorman died on August 13, 1946, at his home in Winnipeg, aged 74, after a brief illness.

Born at Hantsport, N.S., of Irish parents, he received his early education there and graduated in medicine from Dalhousie University. Later Dr. Dorman took post-graduate study at Edinburgh and London and then practised in Winnipeg for forty-five years. He is survived by his widow and three daughters.

Dr. Albert Ernest Medd

Dr. Albert Ernest Medd died suddenly at his home in Winnipegosis on August 13, 1946. Born in Wolseley, Sask., 63 years ago, he moved with his family at an early age to Brandon. In 1909 he graduated in medicine from Manitoba Medical College and went to Winnipegosis, where he practised continuously till his death.

He carried on a large private practice and was the medical officer of five Indian reserves. Dr. Medd took a keen interest in community work. He was Chairman of the School Board, Health Officer and a member of the Masonic and Elk Orders.

Besides his wife he is survived by three sons and two daughters. One of his sons, Dr. Dallas Medd, resides in Winnipeg.

Dr. Medd was in the first rank of rural practitioners.

It is with a sad heart that the writer pays tribute to Ernie Medd on his passing. He stood for the best in medicine and was a tower of strength to the community in which he brought help and healing for thirty-seven years.

Ross Mitchell.



During the life-time of a woman there is a periodic need for iron. Uncomplicated, acute iron deficiency anemia responds dramatically to treatment with Hematinic Plastules Plain. When the anemia is chronic or of nutritional origin, many clinicians find it advisable to combine liver and iron therapy. 1-2

1. WHIPPLE, G.H., F.S. ROBSCHKEIT-ROBBINS and G. B. WALDEN, Blood regeneration in severe anemia. XXI. A liver fraction potent in anemia due to hemorrhage, Am. J. Med. Sc. 179:628-643 (May) 1930.

2. MOORE, C.V., Iron and the essential trace elements in Wald, M.G. Dietotherapy, Philadelphia and London, W. B. Saunders Co., 1945 pp. 98-107.

Hematinic Plastules

Trade Mark Reg. in Canada

PLAIN

BOTTLES OF 75

DOSE: One Plastule three times daily

Prescribe 75 to ensure at least 25 days medication

WITH LIVER

BOTTLES OF 50 and 150

DOSE: Two Plastules three times daily

Prescribe 150 to ensure at least 25 days medication

JOHN WYETH & BROTHER (CANADA) LIMITED • WALKERVILLE, ONTARIO

Personal Notes and Social News

Dr. George Frank Boulton, son of Mrs. V. Boulton and the late M. F. Boulton, was married August 31st, in Augustine United Church, Winnipeg, to Barbara Mary, elder daughter of Dr. and Mrs. O. J. Day of Winnipeg.

Dr. and Mrs. Sol Kobrinsky, of Winnipeg, announce the engagement of their second daughter, Sylvia, to Dr. S. Luginsky, of Beausejour, Man., son of Mr. and Mrs. H. A. Luginsky.

Dr. Hugh Malcolmson, son of the late Mr. and Mrs. George Malcolmson, of Winnipeg, was married August 14th, in Banff, Alta., to Mary Maitland, only daughter of Mr. and Mrs. F. M. Dillon, of Banff.

Dr. and Mrs. A. Portigal wish to announce the birth of a son, Lawrence David, at the Winnipeg General Hospital on August 5th, 1946.

Dr. and Mrs. James Osborne have left by plane for Churchill, Man. From there they will sail on the Nascope for Pangnirtung, Baffin Island, where they will be stationed for the next two years.

Dr. Maurice C. Gyde, of St. Pierre, Man., was married on August 24th, in Holy Cross Church, Norwood, to Marjorie Matilda, elder daughter of Mr. and Mrs. G. B. McPherson, St. Vital. Dr. Gyde is the only son of Mr. and Mrs. M. Gyde, of St. Boniface, Man.

Dr. J. D. Lieshman, formerly of 400 Power Building, Winnipeg, has moved to Regina, Sask.

Dr. Jack H. Cohen, son of Mrs. A. Cohen and the late Mr. A. Cohen, is engaged to marry Sarah, daughter of Mr. C. Lack and the late Mrs. C. Lack. The wedding to take place September 12th.

Dr. Charles Acheson, son of Mr. and Mrs. Sid Acheson, Oak Bluff, Man., was married on August 30th, at St. Patrick's Rectory, to Yvonne, only daughter of Mr. and Mrs. F. Ryckebosch, of Watson, Sask.

Medical Council Examinations

Dr. Fenton Argue, registrar of the Medical Council of Canada, announced that the following Manitoba candidates successfully passed the July examinations:

Henry A. Kachuk, Winnipeg; Joseph M. Kagan, Winnipeg; Charles E. Acheson, Oak Bluff; Julian P. Adamson, Winnipeg; David E. Aikenhead, Winnipeg; Kurt Anstreicher, Brandon; James G. Barrie, St. Vital; Melville M. Brown, Winnipeg; Edward G. Brownell, Winnipeg; James S. Campbell, Winnipeg; Alan M. Davison, Winnipeg; Harold L. Davies, Winnipeg; Oscar Decter, Winnipeg; Garth R. Diehl, Portage la Prairie; Clifford N. Edwards, Transcona; Svein H. O. Eggertson, Winnipeg; Leonard Greenberg, Winnipeg; Henry Guenther, Winnipeg; Howard H. Hall, Winnipeg; Arthur L. Harvey, Winnipeg; Jean Marie Huot, St. Boniface; Wilbur C. B. Janes, Winnipeg; Elizabeth P. Johnson, Winnipeg; Leslie W. Knight, Souris; William A. Large, Makaroff; Lawrence H. Mason, Makinak; Lawrence S. McMorris, Winnipeg; William G. McPhail, Winnipeg; Max Minuck, Winnipeg; James C. Osborne, St. Vital; Edith K. Peterkin, Winnipeg; Stephanie Petryk, Sifton; Jocelyn I. Robb, Winnipeg; Edgar A. Russell, The Pas; Irvin Schulman, Oak Lake, Man.; Ian L. Shand, East Kildonan; George C. Sisler, Winnipeg; Alex E. Solomon, Winnipeg; Thomas J. Speakman, Winnipeg; Barney Steindel, Winnipeg; George R. Thompson, Winnipeg, and Digby Wheeler, Winnipeg.



CASE HISTORY No. 1...



Report on the Clinical Use of Bone Meal...

... "a six year old child with a grave defect in his dentition and complaining bitterly of pains in his legs was given a brand of decalcium phosphate with vitamin D in ten grain doses twice a day. There was no weight gain and much restlessness... the little chamber he used at night was becoming encrusted with calcium deposit... he was getting very little absorption of the calcium.

"It occurred to us that if we gave bone meal to calves and young animals why shouldn't nature's own combination of bone minerals be completely utilized by any animal body? We sifted and pulverized available bone meal and filled 10 grain capsules. In one week the child was playing as hard as any of his school-mates. There was no more excess calcium deposit, although he was getting three 10 grain capsules daily. He made steady progress in the three years in which we had him under observation and his secondary growth teeth were sound."

See article reprinted in Canadian Medical Journal, June 1944, Vol. 50. (E. M. Martin, M.D.)

Each Osteocap and Osteotab contains purified select bone flour $7\frac{1}{2}$ grains, vitamin A (1000 I.U.) and vitamin D (500 I.U.)

Anglo-Canadian
DRUG  **Company**
 LIMITED
 OSHAWA CANADA

*Please write for clinical trial packages.
 A reprint of this article is available on request.*

Book Reviews

How to Help a Medical Student

Have you among your young friends one who is commencing the study of medicine? If you have you can do him a very real favour by giving him a copy of "Doctor in the Making" by Ham and Salter. It is an ideal book for a freshman—a veritable guide, philosopher and friend which will help him enormously. It will show him how he can get the most out of his lectures. It will show him how to study, how to remember and how to use his knowledge. He will find it useful from his first day in College to his last. It costs \$2.50, is published by Lippincott, and can be purchased from Colcleugh and Co., Sherbrook and Notre Dame Streets.

When You Come to the Convention

you will probably be thinking of the replenishment of your library shelves. During the past few months we have reviewed a number of books on more than ordinary merit and for your convenience we are giving some of the titles:

Everyday Psychiatry. J. D. Campbell. (Lippincott). A simple exposition of the subject which proves its point—that psychiatry can be applied in daily practice by every practitioner. \$7.50.

Clinical Electrocardiography. Scherf & Boyd. (Lippincott). One of the most recent and most compact books upon the subject, prepared for the benefit of those who wish to understand the significance of tracings taken upon their patients. \$10.00.

Pathology in Surgery. Nathan Chandler Foote. (Lippincott). A sine qua non for the surgeon. It deals with pathology from the standpoint of day-by-day surgery and focusses attention upon the matters most important to the operator. \$10.00.

The Physician's Business. Woolfe. (Lippincott). Full of good advice and helpful suggestions on how to have a profitable profession. It is especially valuable for those who are starting in practice and for those who realise the need of being better business men. A nurse or secretary who reads and applies the instruction given in the chapter on Office Personnel will make herself twice as useful to her employer.

Diseases of the Breast. Geschichter. (Lippincott). "The best book on the breast" is the comment of many surgeons. This second edition is even more useful than its popular predecessor.

Psychological Medicine. Curran & Guttman. (Macmillan). A short introduction to psychiatry written so that the busy practitioner may familiarise himself with the more practical aspects of psychiatry, a subject now so much in the limelight. \$3.00.

Clinical Studies Show All-Bran Does NOT Create "Bulk" by Soaking Up Water

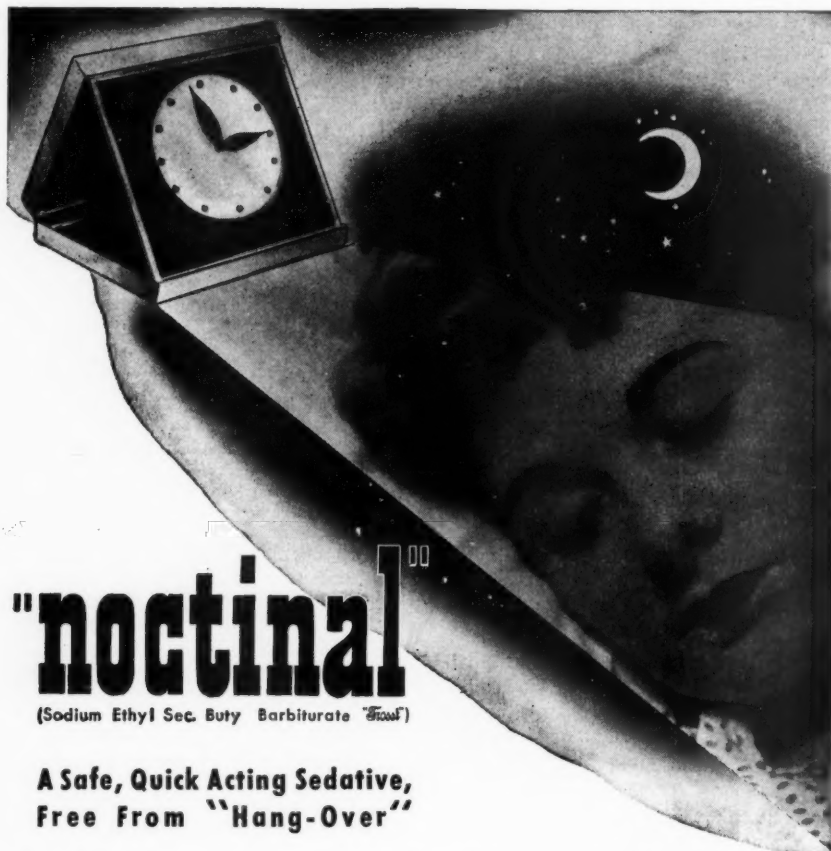
● Recent clinical studies reveal that the usual conceptions of "bulk" in laxation are not applicable to the action of Kellogg's All Bran in the colon. The cellulosic content of bran supports the action of symbiotic intestinal flora. This apparently provides emulsified occluded gas to help produce soft, spongy wastes for easy elimination.

It is now evident that All-Bran does not create "bulk" by soaking up water and, therefore, it produces no unusual colonic distension. It does not sweep out. The particle size of Kellogg's All-Bran, and the degree of laxation, have no discernible correlation. Even when ground to an impalpably fine powder, All-Bran retains its laxative characteristics.

The fact that daily consumption of All-Bran does not interfere with normal digestion is borne out by recent research, from which this and other conclusions made above have been summarized. Reprints covering this research are available upon request by writing to: Kellogg Company of Canada, Ltd., London, Ontario.

A
Food Type
Laxative





"noctinal"

(Sodium Ethyl Sec. Buty Barbiturate "Frosst")

**A Safe, Quick Acting Sedative,
Free From "Hang-Over"**

For sedation, hypnosis and to augment the action of analgesics.

Noctinal is intermediate between the very short acting barbiturates, such as Pentobarbital, and the long acting, like Phenobarbital. It is effective in 30 minutes and lasts 4 to 6 hours. The patient awakes refreshed after a sound, restful sleep, with no "hang-over" of depression.

Noctinal is safe. Even in excess of full therapeutic doses, it has practically no toxic effect on heart, blood pressure, respiration or kidneys. It is easily soluble in water and is quickly eliminated.

DOSAGE

"NOCTINAL" TABLETS

When mild continuous sedation is required: $\frac{1}{2}$ to 1 grain two to three times daily. In insomnia: $1\frac{1}{4}$ grains about one-half hour before retiring. In excited states: $1\frac{1}{2}$ to 3 grains two or three times daily. Best results are obtained if followed by a warm drink.

"NOCTINAL" ELIXIR

Average dose for adults: Two to three fluid drachms (8 to 12 cc.) in a wine glass of water. Maximum daily dose for adults: Two fluid ounces (57 cc.)

MODES OF ISSUE

C.T. No. 352 "Frosst" Noctinal, $\frac{1}{2}$ gr.
C.T. No. 353 "Frosst" Noctinal, $1\frac{1}{4}$ gr.

Elixir No. 601 "Frosst"

Each fluid ounce contains Noctinal, 4 gr.



Since 1899, the Symbol of Progress in
Pharmaceutical Research.

Charles E. Frosst & Co.
MONTREAL CANADA

Establishment of a Medical Research Division

A Division of Medical Research has been established by the National Research Council of Canada to carry on work previously directed through the Associate Committee on Medical Research. Dr J. B. Collip, Director of the Research Institute of Endocrinology, McGill University, Montreal, Chairman of the former Associate Committee, has been appointed Director of the Division. Dr G. H. Ettinger, Professor of Physiology, Queen's University, Kingston, Honorary Secretary of the former Committee, has been appointed Assistant Director of the Division.

A new Committee on Medical Research has been established for the purpose of advising the Division of Medical Research on questions of policy and with respect to medical problems which should be investigated. Under the new organization of this work, the National Research Council will continue to support medical research mainly in the existing medical schools and hospitals throughout Canada, rather than through the establishment of medical research laboratories and appointment of medical research workers under its own auspices.

The general subject of medical research was sponsored by the National Research Council just before the war at the request of the Canadian Medical Association and the Royal College of Physicians and Surgeons. The first Chairman of the Committee was the late Sir Frederick Banting. Early in 1939 he conducted a survey of research facilities in medical schools and hospitals throughout Canada. He found that workers in Canadian laboratories were both eager and able to undertake medical research problems. The Associate Committee then began to receive suggestions for requirements in respect of medical research and related matters and to make awards of grants-in-aid of medical research in various centres throughout the Dominion according to a carefully prepared and comprehensive national plan.

On the outbreak of war the Associate Committee on Medical Research offered its services through the National Research Council to the Dominion Government in the co-ordination of wartime medical research. Visits were paid to Great Britain by Sir Frederick Banting in December, 1939, by Prof. C. H. Best in 1940 and Prof. W. Penfield in 1941 to learn of needs in which Canadian investigators could help. By 1942 most of the budget and activities of the Associate Committee were concerned with war problems, a situation which continued throughout the war. Free exchange of reports and information with the allies prevented overlapping. Conferences to discuss many problems and progress in their

solution were held and these were usually attended by large representation from the United States and frequently from Great Britain and other allied countries.

After the tragic death of Sir Frederick Banting in February, 1941, Dr. J. B. Collip became Chairman of the Committee.

Immediately following the outbreak of war, there was a large influx of medical problems from the three Armed Services. In order to meet this situation, the National Research Council established a separate Medical Research Committee for each Service to deal with the medical problems peculiar to the individual Service, and also made necessary arrangements to ensure that there would be no unnecessary duplication of effort between these committees, and that each Service concerned would receive full benefit from work done by another committee on problems of common concern. These three Committees were discontinued at the close of the war.

Most of the war problems investigated by the Associate Committee on Medical Research were supervised by four subcommittees, all with members from the Services. The Subcommittee on Shock and Blood Substitutes, with Dr. C. H. Best as Chairman, directed researches through Regional Groups in Toronto and Montreal on the fundamental nature of shock, on the use of isinglass as a blood substitute, on the preparation, properties, storage and transportation of dried human blood serum, and on methods of preservation of whole blood and red blood cells. It acted as adviser to the Connaught Laboratories, the Canadian Red Cross Society, and the Department of Pensions and National Health, in the matter of preparation of dried serum, and to the Royal Canadian Army Medical Corps in the preparation of a film demonstrating the recognition and treatment of shock. It issued memoranda on the "Early Recognition and Treatment of Shock" and on the "Organization and Operation of a Blood Bank."

The Subcommittee on Infections, Dr. Duncan Graham, Chairman, organized researches on the diagnosis and treatment of wounds infected with gas gangrene and other organisms, and pioneer experiments on the local application of sulphonamides. It supervised the production of typhus vaccine and Shiga toxoid, and made suitable recommendations to the Department of National Defence concerning their use. It instituted experiments on methods of production and use of penicillin. From its pilot plant in Toronto it supplied large quantities of penicillin to the Department of National Defence, and less amounts for civilians, until the commercial production in

NEW

Triple Sulfa VAGINAL CREAM

NON-SPECIFIC vaginitides associated with breakdown of vaginal or cervical mucosa (as in atrophic vaginitis, ulcerative vaginitis, post-operative vaginitis or cervicitis and other similar conditions) appear to be caused principally by the overgrowth of secondary bacteria.

Suppression of these secondary invaders is, therefore, the logical therapeutic aim.

Triple Sulfa Vaginal Cream, a rational combination of three sulfa derivatives provides bacteriostatic and bacteriocidal action, optimally specific at different, individual pH levels. (1, 2) Clinical investigation has demonstrated that complete mucosal healing and restoration of normal pH can usually be effected within twelve to twenty-one days.



GEARED

FOR TREATMENT

BACTERIAL VAGINITIS AT

SPECIFIC pH LEVELS

Now available at most pharmacies.

TRIPLE SULFA VAGINAL CREAM

An optimal association of sulfathiazole, N'acetylsulfanilamide, N'benzoylsulfanilamide, and urea peroxide, incorporated into a pleasant, water-soluble, absorptive cream base.

ORTHO PHARMACEUTICAL CORPORATION (CANADA) LIMITED — Toronto

1. COWLES, F.B., *Yale Journal of Biology and Medicine* 14: 599-604, July 1942.
2. TOPLEY, W.W.C., and WILSON, G.S.: *The Principles of Bacteriology and Immunity*, 2nd ed., Williams and Wilkins Co., Baltimore, page 44, 1936.

Canada was able to supply ordinary needs. It undertook preparation of an influenza vaccine. It prepared recommendations for prevention of infection of wounds. It advised the Department of National Defence on questions of bacteriological significance as often as requested.

The Subcommittee on Surgery, Dr. Wilder D. Penfield, Chairman, supervised researches through Regional Groups in Montreal, Toronto, London and Winnipeg, and through Sections on Burns, Orthopaedics, Plastic Surgery, Surgical Radiology, Thoracic Surgery, and Traumatic Injuries of the Nervous System. These included investigations on the treatment of burns; infected wounds and peripheral nerve injuries; treatment of low back pain with and without sciatica; use of penicillin; skin grafting; bone grafting; facial prostheses; recognition of non-metallic foreign bodies by X-ray; and surgical problems of air transport of wounded. The Subcommittee arranged important conferences in which surgeon-specialists, both in the Services and in civilian practice, in Canada and from abroad, were called together to consider these matters, and memoranda on certain special subjects were issued by the National Research Council.

The Subcommittee on Industrial Hygiene and Industrial Medicine, Dr. D. Y. Solandt, Chairman, was concerned mainly with health problems in industries active in the manufacture of munitions and supplies.

The Associate Committee also provided the Department of National Defence with recommendations in respect of nutrition and prepared a memorandum on problems of nutrition in Canada, which was submitted to the Ministry of Food, and the Medical Research Council, Great Britain.

In carrying out the foregoing programme of medical research, the Associate Committee had the co-operation and assistance of several hundred leading physicians and surgeons throughout Canada, who were keenly interested in this subject. Their able and willing contributions enabled the Committee to plan and direct medical research during the war on a high level of efficiency and it is not surprising therefore to find that the work has now been so well established as to warrant the creation of a permanent Division of Medical Research within the organization of the National Research Council. Under the new arrangement the existing need for expansion can be met and continuity of research from year to year in selected fields will be provided for on a permanent basis.

T-13 Narcotics Regulations

Ottawa, Aug. 20—Effective September 1, retail druggists will no longer be required to keep under

lock and key the codeine preparations detailed in section 8 of the Opium and Narcotic Drug Act, the Hon. Dr. J. J. McCann, acting minister of National Health and Welfare, pointed out today.

Other changes in the Act are the consolidation into the single list of the narcotics named in the schedule of the Act and a provision that certain codeine preparations, when combined with suitable medicinal ingredients, may be sold by retail druggists without a prescription, providing such items are properly labelled. These preparations include all items containing one-eighth grain codeine when in solid form, or one-third grain codeine per fluid ounce when in liquid form, providing such drug is combined with other suitable medicinal ingredients.

The wartime regulations allowing druggists to accept over the telephone and fill emergency prescriptions for codeine have been cancelled. K. C. Hossick, chief of the narcotic division, pointed out that removal of this privilege has, however, been offset by the fact that prescriptions are no longer required for codeine preparations mentioned in section 8 of the Act.

Dept. of National Health and Welfare.

Section 8 of the Act is as follows: "(a) Any retail druggist may have in possession or may sell or distribute preparations containing one-eighth grain or less of codeine per tablet or other solid form, or liquid preparations containing one-third grain or less of codeine per fluid ounce, when such preparations are combined with other medicinal ingredients and the maximum dose prescribed for the preparation contains (i) one such ingredient not less in quantity than the amount prescribed by the British Pharmacopoeia as a minimum dose for such ingredient; (ii) two such ingredients having a similar action, each not less in quantity than one-half the amount prescribed by the British Pharmacopoeia as a minimum dose for each such ingredient respectively; or (iii) three such ingredients having a similar action each not less in quantity than one-third the amount prescribed by the British Pharmacopoeia as a minimum dose for each such ingredient respectively.

(b) No retail druggist shall sell, or offer for sale except pursuant to direction of a physician, any preparation referred to in paragraph (a) of this subsection unless there is printed in a conspicuous place on an inseparable part of the main panel of the label and wrapper of the bottle, box, or other container, and in letters of the same size and visibility as the directions for the use of the preparation, the full formula or true list of medicinal ingredients, and the following words: 'It is unlawful to administer this preparation to a child under two years of age as it contains codeine and is dangerous to its life.'

PENICILLIN INJECTIONS REDUCED TO ONE OR TWO IN TWENTY-FOUR HOURS

Since the first publication by Romansky of the satisfactory blood levels of penicillin obtained and maintained for a period of eighteen hours following the intramuscular injection of 300,000 units of calcium penicillin in beeswax and peanut oil, both laboratory investigations and collaborative clinical studies in the treatment of gonorrhea and pneumonia have been made by the Connaught Medical Research Laboratories. It has been widely confirmed that penicillin prepared according to the Romansky formula maintains the blood levels which are required in the treatment of gonorrhea and certain other conditions, and permits of one injection every twelve to twenty-four hours.

The Connaught Medical Research Laboratories have prepared a suitable product which can be readily administered with the use of a disposable plastic syringe provided in each package. This syringe, with sterile, built-in needle, is ready for immediate use with a special cartridge containing 300,000 units of calcium penicillin in 1 cc. of beeswax and peanut oil.

Other Penicillin Preparations Available from these Laboratories

For Injection

SODIUM PENICILLIN in sealed
rubber-stoppered vials containing:

100,000	International Units
200,000	" "
300,000	" "
500,000	" "

For Oral Use

CALCIUM PENICILLIN in suitably
buffered tablets in tubes containing:

12 tablets each of
25,000 International Units
12 tablets each of
50,000 International Units

CONNAUGHT MEDICAL RESEARCH LABORATORIES
University of Toronto Toronto 4, Canada

Depot for Manitoba

BRATHWAITES LIMITED
431 Portage Avenue, Winnipeg

The Detail Man

An Interesting Review of His Many Outstanding Qualifications as well as of His Trials and Medical Practice

Personally, we like most "detail men." In case you haven't had contact with one recently, may we refresh your mind on the subject? Were we Linnaeus, we might describe him thus: Genus: Homo Sapiens; Habitat: Distribution almost universal, but becoming scarcer in Middle West due to the draft and lack of enforcement of game laws. (Most doctors think there is a personal open-season on these chaps.) Description: A hardy perennial. (Webster's definition of perennial: "continuing or enduring through the year or many years.") And, Boy, does he continue to endure a lot!

Further description: This suborder of Homo Sapiens not infrequently is married, and sires one or more little detailettes who depend upon the parent shrub for food and raiment. He has the customary complement of manual and pedal appendages; also two ears, two eyes, two lungs and—believe it or not—a heart.

Usually he is a gentleman, which in itself is saying a lot. Obviously this rare specimen has an inexhaustible fund of patience, otherwise he would not be willing to cool his heels in your reception room for long periods of time, awaiting your willingness and readiness to see him for five minutes. He knows, of course, that in order to impress him with your importance, he will have to sit on his quadriceps in the outer sanctum until you get darn good and ready to admit him to your august presence.

He is a non-poisonous plant. Contact with him engenders no long and lingering ailment. He may

be touched with impunity. (In fact, we have known instances where he was "touched" for several dollars worth of valuable samples, simply for the asking.) He is odorless and tasteless, but is not, as we have implied, without feeling. He may be, at his worst, the rambler type of plant, in that he rambles on past the few minutes allotted to him, but still he cannot be classed with Rhus Toxicodendron or the Spiny Cactus.

Often he is addicted to tobacco, but unless you first light a cigarette, usually he will refrain from doing so while in your presence. He knows from long and bitter experience that while he is non-toxic, some doctors can be poisonous as toad stools—especially to "detail men."

So if you see one of these roving, self-abnegative, hard-working, patient and pleasant fellows beginning to take root in your reception room, for Heaven's sake have the girl bring him in before he becomes a permanent potted plant before your very eyes. Because all of you know how much easier it is to dispose of cut flowers than a jardiniere full of flowering hydrangeas.

But seriously, Fellows, let's give these boys a break. We are busy, of course, but not too busy to spare a few minutes of our time when it easily might be of mutual benefit. Ever hear of the Golden Rule? Think it over sometime; it will do you good.

J. Phil. Edmundson, M.D.

Courtesy Mead, Johnson & Co., Evansville, Ind.

Microfilm Service

Microfilms of journal articles not on file locally may be obtained from the Army Medical Library, Washington, D.C., U.S.A., of material on file there. There is no charge for this photoduplication service which is "... intended to supplement the services of the local library and not in any way supplant them ..."

All filming is done on special request for the particular article desired. The publication "Current List of Medical Literature" which lists the material received at the Army Medical Library, is on file here.

Microfilms will be furnished to individuals requesting them, but the Army Medical Library

prefers that the requests will be sent through a medical library.

For further information enquire at the Medical Library, 29 545.

Free Library Postal Rate for the Medical Profession Within Manitoba

The Medical Library has a reduced postal rate for use on all loans of BOOKS and PERIODICALS mailed to the medical profession residing within the Province of Manitoba. When the borrower receives the loans, all that has to be done, is to SAVE THE WRAPPER, with the LABELS supplied by the library, and follow the instructions thereon. NO POSTAGE need then be PAID.

"There is no doubt whatever that most vitamins are prescribed in a dosage that is far too small to do any particular good . . ."

—Snell, A. M.: *Proc. Staff Meet. Mayo Clinic* 15: 216 (Apr. 3) 1940.



Snell's conclusion was reached after a study of patients suffering from lesions of the gastrointestinal tract, post-operative vitamin deficiencies or inadequate food intake. In such cases, he believes that large doses of vitamins should augment as liberal a diet as possible.

To provide intensive therapy in such multi-vitamin deficiency states "Theravite" Capsules supply an effective

quantity of nine different vitamin factors.

Each "Theravite" Capsule contains:

Vitamin A.....	25,000 Int. Units
Vitamin D.....	1,500 Int. Units
Vitamin B ₁	5 mg.
Riboflavin.....	5 mg.
Vitamin C.....	100 mg.
Pyridoxine (vitamin B ₆) . .	1 mg.
Nicotinamide.....	30 mg.
Pantothenic Acid.....	3 mg.
Mixed Tocopherols.....	10 mg.



"Theravite" Capsules (No. 238) are supplied in bottles of 30 and 100.

Department of Health and Public Welfare

Comparisons Communicable Diseases — Manitoba (Whites and Indians)

DISEASES	1946		1945		TOTALS	
	June 16 to July 13	May 19 to June 15	June 17 to July 14	May 20 to June 18	Jan. 1 to July 13, '46	Jan. 1 to July 14, '45
Anterior Poliomyelitis	1	—	1	1	2	10
Chickenpox	140	124	242	240	793	1542
Diphtheria	7	15	11	13	105	165
Diphtheria Carriers	2	1	—	2	11	24
Dysentery—Amoebic	—	—	—	—	1	—
Dysentery—Bacillary	—	—	1	4	1	7
Erysipelas	3	4	4	2	46	33
Encephalitis	1	—	1	1	1	4
Influenza	4	4	2	18	158	136
Measles	571	407	53	127	1292	452
Measles—German	4	—	5	11	16	33
Meningococcal Meningitis	2	—	—	1	11	10
Mumps	136	302	133	187	1750	1137
Ophthalmia Neonatorum	—	—	—	—	—	—
Pneumonia—Lobar	2	14	8	16	96	93
Puerperal Fever	—	—	—	—	1	1
Scarlet Fever	54	63	40	56	392	451
Septic Sore Throat	—	—	2	4	20	16
Smallpox	—	—	—	—	—	—
Tetanus	—	1	—	—	1	—
Trachoma	—	1	—	—	1	—
Tuberculosis	56	110	60	70	520	354
Typhoid Fever	1	1	1	1	10	28
Typhoid Paratyphoid	1	—	2	1	1	5
Typhoid Carriers	—	—	—	—	2	2
Undulant Fever	1	2	1	1	10	9
Whooping Cough	9	18	9	16	172	218
Gonorrhoea	199	152	169	182	1314	1003
Syphilis	48	57	32	42	378	312
Diarrhoea and Enteritis, under 1 yr.	25	23	2	1	108	4

DISEASES

(White Cases Only)

* Approximate population.

	*732,000 Manitoba	*3,825,000 Ontario	*906,000 Saskatchewan	*2,972,000 Minnesota	*641,000 North Dakota
Anterior Poliomyelitis	1	1	—	70	3
Meningococcal Meningitis	2	8	1	8	4
Chickenpox	140	1,134	153	—	14
Diphtheria	7	15	2	9	3
Diphtheria Carriers	2	—	—	—	—
Diarrhoea and Enteritis, under one year	25	—	—	—	6
Dysentery—Amoebic	—	1	—	2	—
Erysipelas	3	3	—	—	2
Influenza	4	7	—	2	12
Jaundice (Infectious)	—	5	—	—	—
Leth. Enceph.	1	—	—	—	—
Measles	571	1,710	103	156	42
Measles—German	4	71	2	—	—
Mumps	136	828	167	—	—
Pneumonia, Lobar	2	—	—	—	41
Scarlet Fever	54	148	8	76	10
Septic Sore Throat	—	15	—	—	—
Tularemia	—	—	—	1	1
Tuberculosis	56	251	56	4	25
Typhoid Fever	1	5	2	2	5
Typh. Para-Typhoid	1	2	1	—	—
Undulant Fever	1	8	—	13	1
Whooping Cough	9	302	1	31	7
Gonorrhoea	199	566	—	—	73
Syphilis	48	347	—	—	20

DEATHS FROM COMMUNICABLE DISEASES

For the Month of June, 1946

Urban—Cancer, 40; Influenza, 1; Measles, 1; Pnenmonia, Lobar, 5; Pneumonia (other forms), 5; Syphilis, 2; Tuberculosis, 7; Diarrhoea and Enteritis (under two years), 8. Other deaths under 1 year, 22. Other deaths over 1 year, 187. Stillbirths, 21.

Rural—Cancer, 36; Influenza, 2; Pneumonia, Lobar, 3; Pneumonia (other forms), 7; Syphilis, 3; Tuberculosis, 13; Cerebrospinal Meningitis, 2; Septicemia, 1; Disease of Pharynx and Tonsils, 1; Diarrhoea and Enteritis (under two years), 5. Other deaths under 1 year, 24. Other deaths over 1 year, 142. Stillbirths, 16.

Indians—Influenza, 3; Pneumonia (other forms), 4; Tuberculosis, 5; Whooping Cough, 1. Other deaths under 1 year, 2. Other deaths over 1 year, 6.



Anterior Poliomyelitis at time of writing (August 14, 1946) is not epidemic in Canada excepting in Montreal. It is, however, epidemic in Minnesota and to some extent in North Dakota as well as in other States of the Union.

Diphtheria incidence so far in 1946 is less than in 1945 but more immunization must be done. How about clinics in September?

Diarrhoea and Enteritis under one year of age is very prevalent and is causing a considerable number of deaths. We have a new pamphlet on it for distribution.

Undulant Fever—A pamphlet has been printed and is ready for distribution.

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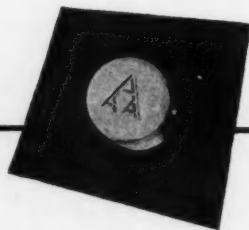
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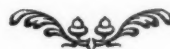
Doctors Returned to Civilian Practice from Armed Forces

The following doctors have been discharged from the services and are now back in practice.

Name	Address	Telephone
Adamson, Dr. Gilbert L.,	Winnipeg Clinic, Winnipeg	97 284
Adamson, Dr. J. D.,	Winnipeg General Hospital	87 681
Alexander, Dr. Walter,	214 Medical Arts Bldg., Wpg.	95 300
Allen, Dr. C. S.,	216 Panama Court, Winnipeg	41 185
Anderson, Dr. Julius,	185 Maryland St., Winnipeg	404 065
Austman, Dr. K. J.,	704 McArthur Bldg., Winnipeg	95 826
Avren, Dr. S. S.,	416 McKenzie St., Winnipeg	59 422
Barrie, Dr. J. G.,	11 Rosewarne Ave., St. Vital	204 643
Baldry, Dr. Geo. S.,	616 Medical Arts Bldg., Wpg.	94 980
Beamish, Dr. R. E.,	216 Medical Arts Bldg., Winnipeg	94 354
Beckstead, Dr. J. L.,	619 Arlington St., Winnipeg	36 272
Belland, Dr. S.,	400 Aberdeen Ave., Winnipeg	54 679
Bell, Dr. P. G.,	Deer Lodge Hospital, Winnipeg	62 821
Bennett, Dr. Wm. J.,	12 Newhaven Apts., Winnipeg	33 772
Benoit, Dr. C. F.,	114 Claremont Ave., Norwood	202 470
Berger, Dr. M.,	428 Anderson Ave., Winnipeg	58 345
Berbrayer, Dr. Peter,	205 Boyd Bldg., Winnipeg	94 112
Berger, Dr. M.,	428 Anderson Ave., Winnipeg	58 345
Black, Dr. Geo. M.,	325 Washington Ave., Winnipeg	503 054
Bleeks, Dr. Cherry K.,	105 Medical Arts Bldg., Wpg.	93 273
Bottomley, Dr. H. W.,	Winnipeg Clinic, Winnipeg	97 284
Boyd, Dr. Wm. J.,	1012 Ingersoll St., Winnipeg	24 427
Brotman, Dr. E. H.,	1137 Portage Ave., Winnipeg	36 500
Brown, Dr. M. M.,	508 Medical Arts Bldg., Winnipeg	93 889
Bruce, Dr. J. D.,	20 Buckingham Apts., Winnipeg	96 780
Bruser, Dr. D. M.,	58 Noble Ave., Winnipeg	97 284
Burch, Dr. J. E.,	Winnipeg Clinic, Winnipeg	97 284
Cadham, Dr. R. G.,	City Hall Winnipeg	849 122
Chestnut, Dr. H. W.,	25 Knappen Ave., Winnipeg	97 284
Carleton, Dr. M.,	603 Boyd Bldg., Winnipeg	94 763
Clark, Dr. C. W.,	216 Medical Arts Bldg., Winnipeg	94 354
Colpitts, Dr. Grant E.,	602 Medical Arts Bldg., Wpg.	93 996
Cooper, Dr. Ross H.,	212 Medical Arts Bldg., Winnipeg	93 103
Corrigan, Dr. C. E.,	307 Waterloo St., Winnipeg	401 271
Cohen, Dr. Harvey,	153 Cathedral Ave., Winnipeg	56 007
Cohen, Dr. R.,	600 Boyd Bldg., Winnipeg	93 275
Coke, Dr. L. R.,	238 Spence St., Winnipeg	97 284
Collins, Dr. D. R.,	Internes' Quarters, Winnipeg General Hospital, Winnipeg	87 681
Cram, Dr. J. B.,	409 Power Bldg., Winnipeg	95 165
Croll, Dr. L. D.,	661 Broadway, Winnipeg	72 138
Daniel, Dr. E.,	Winnipeg General Hosp., Winnipeg	87 681
Davies, Dr. H. L.,	613 Boyd Bldg., Winnipeg	95 683
Davidson, Dr. Kenneth,	6 Medical Arts Bldg., Wpg.	95 683
Davidson, Dr. Allan M.,	1293 Wolseley Ave., Winnipeg	33 822
Davidson, Dr. A. M.,	6 Medical Arts Bldg., Winnipeg	95 683
Decter, Dr. P. H.,	283 Magnus Ave., Winnipeg	59 183
Dennis, Dr. F. T.,	Deer Lodge Hospital, Winnipeg	64 861
Doupe, Dr. J.,	592 Stradbroke Ave., Winnipeg	46 501
Downey, Dr. J. L.,	333 Bartlett Ave., Winnipeg	46 751
Drulak, Dr. Stephen,	965 Garfield St., Winnipeg	27 577
Easton, Dr. S.,	216-7 Curry Bldg., Winnipeg	26 477
Edwards, Dr. K. N.,	139 Girton Boulevard, Tuxedo, Man.	204 394
Elliott, Dr. M. R.,	140 Lawndale Ave., Norwood	204 394
Elvin, Dr. Norman L.,	314 Medical Arts Bldg., Wpg.	95 317
Eshoo, Dr. H.,	Misericordia Hospital, Winnipeg	37 035
Evoiy, Dr. G. H.,	264 Edmonton St., Winnipeg	94 335
Fahrni, Dr. G. P.,	105 Medical Arts Bldg., Winnipeg	93 605
Fahrni, Dr. Gordon S.,	105 Medical Arts Bldg., Wpg.	93 273
Fairfield, Dr. G. C.,	Portage la Prairie, Man.	94 001
Feinstein, Dr. M. S.,	72 Harrow St., Winnipeg	97 284
Feldsted, Dr. E. T.,	Winnipeg Clinic, Winnipeg	92 934
Flett, Dr. R. O.,	203 Medical Arts Bldg., Winnipeg	92 934
Franks, Dr. Fred,	492 Mountain Ave., Winnipeg	30 576
Fryer, Dr. A. I.,	5 Gloucester Apts., Winnipeg	403 505
Furman, Dr. M. J.,	463 Ash St., Winnipeg	96 232
Galloway, Dr. G. D.,	74 St. Mary's Rd., Norwood	96 232
Gordon, Dr. Athol R.,	505 Medical Arts Bldg., Wpg.	96 232

Govan, Dr. W. R., Abbott Clinic, 409 Power Bldg., Winnipeg	95 165
Green, Dr. P. T., 201 Hampton St., St. James, Man.	61 622
Greenberg, Dr. L., 901 Boyd Bldg., Winnipeg	95 205
Guest, Dr. W. C., 151 Yale Ave., Winnipeg	
Hall, Dr. C. W., 1328 Pembina Highway,	
Hamilton, Dr. Glen F., 408 Medical Arts Bldg., Wpg.	93 846
Hastings, Dr. D. J., 634 Somerset Bldg., Winnipeg	98 727
Hayter, Dr. F. W., Deer Lodge Hospital, Winnipeg	64 861
Hart, Dr. W. J., 185 Kelvin St., Winnipeg	
Helgason, Dr. R. E.	Glenboro, Man.
Henneberg, Dr. C. C., 302 Medical Arts Bldg., Wpg.	92 710
Hitesman, Dr. R. J., 512 Medical Arts Bldg., Wpg.	94 808
Hillsman, Dr. J. A., 308 Medical Arts Bldg., Winnipeg	97 329
Holland, Dr. T. E., 203 Medical Arts Bldg., Winnipeg	96 948
Homik, Dr. A. M., 612 Cathedral Ave., Winnipeg	
Houston, Dr. A. B., 937 Warsaw Ave., Winnipeg	45 925
Hunter, Dr. H. B. M., Deer Lodge Hospital, Winnipeg	64 861
Ireland, Dr. J. R., Deer Lodge Hospital, Winnipeg	64 861
Israels, Dr. S., 701 Boyd Bldg., Winnipeg	97 223
Jacks, Dr. Q. D., 410 Medical Arts Bldg., Winnipeg	95 309
Jauvoish, Dr. S., 206 Boyd Bldg., Winnipeg	93 240
Jones, Dr. E. A., Ste. 5, 117 Bryce St., Winnipeg	43 283
Kasian, Dr. P., St. Joseph's Hospital, Winnipeg	57 211
Kiernan, Dr. M. K., Winnipeg Gen. Hosp., Winnipeg	67 681
Kilgour, Dr. J. M., Winnipeg Clinic, Winnipeg	97 284
Kippen, Dr. D. L., 188 Home St., Winnipeg	35 987
Klass, Dr. A. A., 132 Matheson Ave., Winnipeg	55 022
Kobrinsky, Dr. Sam, 602 Medical Arts Bldg., Wpg.	95 875
Kobrinsky, Dr. Sydney, 505 Boyd Bldg., Winnipeg	93 912
Kobrinsky, Dr. M. T., 968 Strathcona St., Winnipeg	71 498
Lander, Dr. H. A., 551 College Ave., Winnipeg	55 110
Lazarek, Dr. T. L., 616 Aberdeen Ave., Winnipeg	53 674
Leach, Dr. W. B., 150 Alloway Ave., Winnipeg	71 971
Leishman, Dr. J. D., 400 Power Bldg., Winnipeg	96 234
Lebbetter, Dr. T. A., Winnipeg Clinic, Winnipeg	97 284
Lerner, Dr. A. I., 211 McIntyre Bldg., Winnipeg	96 961
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Lotimer, Dr. L. E., Winnipeg Clinic, Winnipeg	97 284
Lund, Dr. P. C., Deer Lodge Hospital, Winnipeg	62 821
L'vons, Dr. R., 420 Niagara St., Winnipeg	404 009
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MacDonnel, Dr. J. A. K. (lady), Winnipeg Clinic	97 284
MacKinnon, Dr. W. B., 661 Broadway, Winnipeg	72 138
Maclean, Dr. Ian S., Winnipeg Clinic, Winnipeg	97 284
MacLeod, Dr. J. W., Winnipeg Clinic, Winnipeg	97 284
Malkin, Dr. S., 701 Boyd Bldg., Winnipeg	97 223
Malone, Dr. M. C., St. Boniface Hosp., St. Boniface	201 121
Martin, Dr. J. H., St. Boniface Hospital, St. Boniface, Man.	201 121
Marmar, Dr. M., 265 Flora Ave., Winnipeg	55 131
Margolese, Dr. J., 414 Boyd Bldg., Winnipeg	24 541
Mathewson, Dr. F. A. L., 308 Med. Arts Bldg., Wpg.	94 942
Medovy, Dr. Harry, 401 Boyd Bldg., Winnipeg	93 849
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Mitchell, Dr. J. R., Ste. 10 Fairhaven Apts., Winnipeg	72 187
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Moir, Dr. J. H., 41 Springdale Ave., St. Vital, Man.	205 543
Moore, Dr. C. H., 116 Medical Arts Bldg., Winnipeg	97 706
McCulloch, Dr. A. W., Deer Lodge Hosp., Winnipeg	64 861
McFarlane, Dr. R. H., Internes' Quarters, General Hospital, Winnipeg	87 681
McFetridge, Dr. W. J. M., 104 Arlington St., Winnipeg	
McIntyre, Dr. Donald N. C., 303 Med. Arts Bldg., Wpg.	92 635
McKenty, Dr. J. Stewart, 514 Med. Arts Bldg., Wpg.	92 711
McKenty, Dr. Jack, 121 Girton Blvd., Tuxedo, Man.	61 777
Winnipeg	42 496
McKenty, Dr. V. J., 205 Boyd Bldg., Winnipeg	94 112
McLandress, Dr. Murray, Apt. "D" Brentwood Lodge,	
MacNeil, Dr. Robert W., 608 Medical Arts Bldg., Wpg.	96 539
McNicol, Dr. H. L., Deer Lodge Hospital, Winnipeg	62 821
McPhail, Dr. D. M., St. Bon. Hosp., St. Boniface, Man.	201 121
McPhail, Dr. Ethel M., 90 Roslyn Road, Winnipeg	
McTavish, Dr. Geo. B., 206 Affleck Block, Winnipeg	96 620

Name	Address	Telephone		
Natsuk, Dr. A. W., 75 Sherbrook St., Winnipeg		36 821	Hudson, Dr. J. E.	Hamiota, Man.
Neilson, Dr. Clive, 404 Medical Arts Bldg., Winnipeg		94 041	Hunt, Dr. D. W.	Whitemouth, Man.
Orchard, Dr. S. A., St. Boniface Hosp., St. Boniface		201 121	Jacobs, Dr. A. L.	The Pas, Man.
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Pickard, Dr. E. W., 118 Lenore St., Winnipeg			Juneke, Dr. V. D.	St. Rose du Lac, Man.
Pierce, Dr. M. M., 354 Stella Ave., Winnipeg		54 134	Knight, Dr. L. W.	Souris, Man.
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Ridge, Dr. J. M., Clearwater Indian Hospital, The Pas, Man.			North, Dr. W. H. C.	Viriden, Man.
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Rumball, Dr. A. C., Deer Lodge Hospital, Winnipeg		62 821	Schulman, Dr. I.	Oak Lake, Man.
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Rutherford, Dr. W. G., 695 Wolseley Ave., Winnipeg		33 569	Shier, Dr. L. R.	Pierson, Man.
Ryan, Dr. George H., Winnipeg Clinic, Winnipeg		97 284	Sneath, Dr. I. W.	Pine Falls, Man.
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Schoemperlen, Dr. C. B., 216 Medical Arts Bldg., Wpg.		94 354	Varverikos, Dr. E. D.	Selkirk, Man.
Shaver, Dr. W. A., 596 Spruce St., Winnipeg			Watkins, Dr. R. T.	Brandon, Man.
Smith, Dr. N. S. H., 275 Duffield St., St. James		63 224	Wood, Dr. W. J., 354 Borebank St., Winnipeg	402 839
Smith, Dr. F. Hartley, 86 Tache Ave., Norwood, Man.		203 993	Yaholnitsky, Dr. R.	Baldur, Man.
Sommerville, Dr. A. N., 614 St. Mary's Rd., St. Vital		202 411		
Sommerville, Dr. A. N., 614 St. Mary's Rd., St. Vital				
Steindel, Dr. B., 154 Spence St., Winnipeg		36 979		
Stephens, Dr. Gordon M., 635 Henderson Hy., Wpg.		503 965		
Stephenson, Dr. Earl, 409 Power Bldg., Winnipeg		95 165		
Stewart, Dr. D. B., 30 Ferndale Ave., Norwood, Man.		205 298		
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Swan, Dr. R. S., 215 Medical Arts Bldg., Winnipeg		94 354		
Tanner, Dr. A. R., 310 Medical Arts Bldg., Winnipeg		95 946		
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Taylor, Dr. J. R., 6B Chelsea Court, Winnipeg				
Tisdale, Dr. Paul K., Deer Lodge Hospital, Winnipeg		62 821		
Valsrub, Dr. Samuel, 310 Redwood Ave., Winnipeg				
Wakefield, Dr. G. E., Ste. 1, 270 Roslyn Rd., Winnipeg		44 889		
Walton, Dr. C. H. A., Winnipeg Clinic, Winnipeg		97 284		
Walton, Dr. Fred A., 3 Locarno Apts., Winnipeg		45 719		
Whelpley, Dr. E. H., 588 Ingersoll St., Winnipeg		39 061		
White, Dr. O. J., Winnipeg General Hosp., Winnipeg		87 681		
Whiteford, Dr. J. W., 520 Medical Arts Bldg., Wpg.		92 920		
Whitehead, Dr. Robt. G. D., 91 Maryland St., Wpg.				
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Wilt, Dr. J. C., Winnipeg Gen. Hosp., Winnipeg		87 681		
Winram, Dr. R. G., Ste. 51 Roslyn Apts., Winnipeg				
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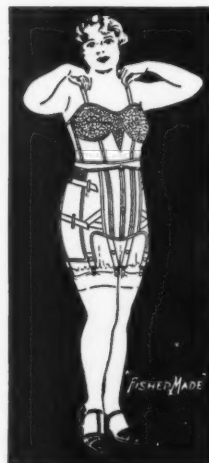
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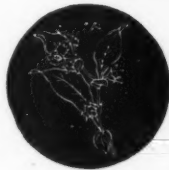
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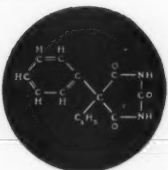
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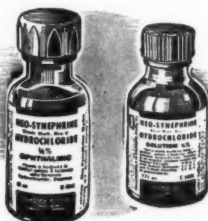
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INDICATIONS: HEMOBROM tablets may be used with assurance of greater safety and efficacy wherever bromides are indicated as sedatives and hypnotics. Recommended for the treatment of insomnia, nervous excitability and emotional instability.

Each tablet contains: Brominated Blood Albumin, 4½ grains, Sodium Bromide, ½ grain; plus excipient and coating. The bromide content is 33.58% corresponding to half the bromide content of potassium bromide.

DOSAGE: The sedative dose for adults is 1 tablet with a little water, three times daily after meals. As a hypnotic 2 or 3 tablets immediately before retiring. Supplied in bottles of 50 and 500 tablets.

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